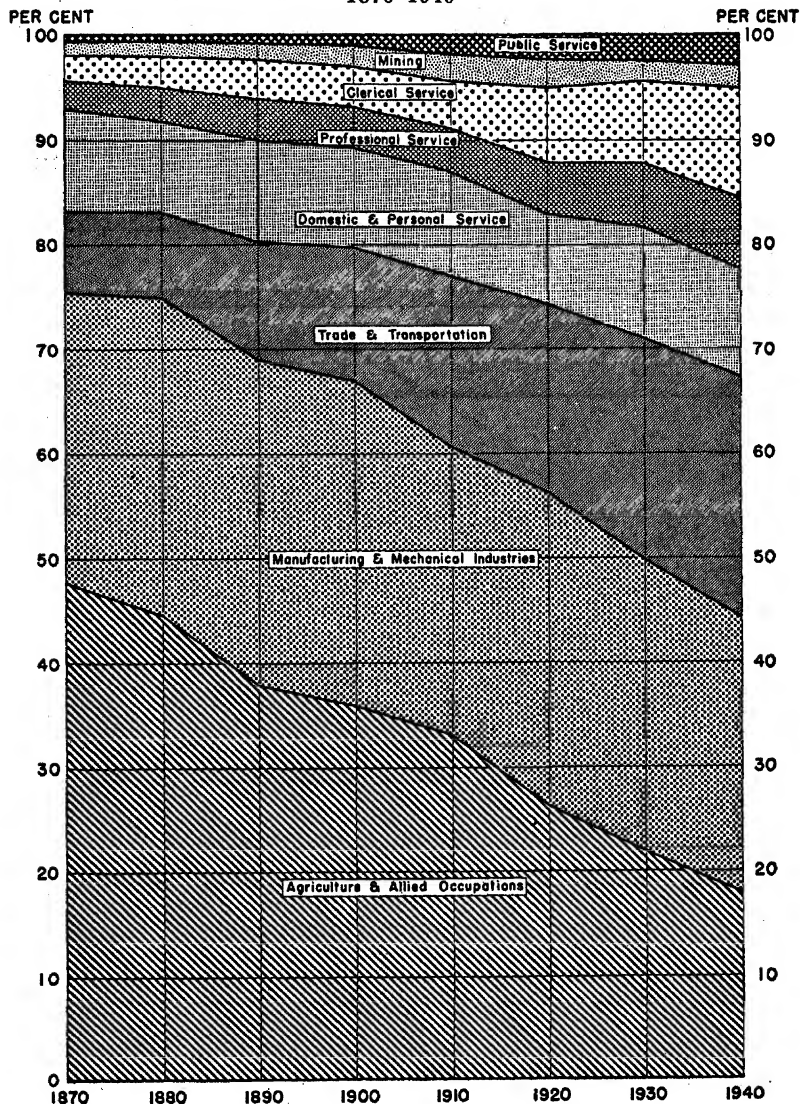


OCCUPATIONAL TRENDS

CHART 1
DISTRIBUTION OF GAINFULLY EMPLOYED, BY OCCUPATIONAL CATEGORIES,
1870-1940



OCCUPATIONAL TRENDS

IN THE UNITED STATES

H. DEWEY ANDERSON
and
PERCY E. DAVIDSON

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PREFACE

This study of occupational trends is offered to educators, vocational guidance specialists, personnel managers, and social scientists as basic information concerning the composition and changing conditions of the American working population. It brings together in usable form for the first time the reports for the occupational classes of the seven volumes of the *Census of Occupations* published from 1870 to 1930 together with certain estimates for 1940. It groups these valuable statistics under captions which denote comparable occupations so far as these can be determined from the census data, and consequently it portrays trends and permits inferences which are believed to have value to anyone engaged in the training and placement of workers or in the analysis of changing conditions in the occupational life of the nation.

The decennial *Census of Occupations* presents figures for the so-called "gainfully employed." These do not represent actual employment figures, but are to be regarded as information showing the occupational distribution of that part of the population which is either employed or seeking work. They therefore picture the composition of the available man power of the nation at each census year. The successive decennial records of these "gainful workers" offer important information as to the character and changing emphasis of economic life in the United States. In order to indicate more clearly the nature of these changes and their effect upon the labor force, investigation has been made of technological and other influences at work in particular industries and professions, the findings being related to the occupational trends in such a manner as to lead to judgments of the probable immediate future of occupational groups in this country. These results should have considerable practical value for the study of social trends.

The *Census of Occupations* for 1940 will not be available until some time in 1942. It is the intention of the writers to prepare a supplement to the present volume based upon the 1940 data. However, statistical projections have been made for the major categories through 1940. Moreover, the writers have been actively engaged in research and administrative work which has enabled them to keep abreast of developments during the past decade, so that conclusions drawn from the data presented

in the present volume are believed to possess relevancy in appraising the current occupational situation.

It is the purpose of the study to indicate how changing conditions in the life of the nation are reflected in and have an influence upon the number of gainful workers in particular occupations. Consequently, relevant data are assembled in order to determine the adequacy of the labor force in relation to the recent and current need for its labor. Incidentally, attention is given to the effect of trends upon wages and salaries with a view to noting to what extent workers share in the values created by the expansion of industry. The role of technology is examined and its effects on occupations are approximated. Other decisive or contributory factors affecting occupational trends are noted as the individual case seems to warrant, such as public policy, occupational barriers to training and employment, "acts of God," depletion of materials, labor disputes, alterations in working conditions, the business cycle, age and sex composition of the labor force, access to capital, and changing tastes and styles. While the mass of material the writers have regarded as indispensable may seem to burden their theme, even this large volume would have to be much larger were all the documentary and supporting evidence included.

This study has been in progress for over three years. It could not have been completed except for the generous support of many qualified persons who gave freely of their time in assisting in the solution of problems of statistical procedure or in forming judgments concerning the meaning of the data. Officials of the district and state offices of the Work Projects Administration aided in critically reviewing the method employed and supervised the details required to secure funds for tabulators, clerks, and research assistants. Dr. Isador Lubin, Director of the Bureau of Statistics, United States Department of Labor, was most helpful in securing documents required in this investigation and in encouraging the writers to proceed with it. The essential details of compiling the data and assembling the tables were carried forward as Work Projects Administration Research Project Number 465-03-3-649, at Stanford University, sponsored first by the city of Palo Alto and subsequently by the Board of Supervisors of Santa Clara County.

Linna V. Culver has been in charge of the project as its supervisor from its inception, and to her must go much of the

credit for the successful completion of an extensive and involved investigation. Concealed from the reader in this finished study are countless hours spent in reconciling differences in the census for the several decades, in checking and rechecking figures, and in building and rebuilding tables—laborious details essential to insure an accurate and comprehensive report. Mrs. Culver and her assistants have worked faithfully, diligently, and ably to present a solid and intelligible body of information. Miss Florence Hanley has carried much of the responsibility for tabulating the census data. The index has been supplied by Mrs. Viola Jacobs. William Goldner ably reviewed the compilations and prepared the projections of occupational data for 1940. The writers also wish to make grateful acknowledgment of favors granted by Stanford University in allotting space for housing the investigation and providing facilities for the use of the project.

This undertaking has been the joint responsibility of the writers, who have worked together in a most agreeable and stimulating partnership for many years. This is the second report in an anticipated series. The first volume, *Occupational Mobility in an American Community*, was published in 1937. In process of development and soon to be published is a third report dealing with a vertical scale of occupations based upon rates of pay and earnings. The fourth study in progress is an investigation of the political behavior and voting records of occupational groups. A fifth research now under way is a study of occupational trends in California since 1870, following the plan developed in this volume.

While opinions have been sought from competent persons whose advice has been followed in preparing this report and whose aid is sincerely appreciated, the authors accept responsibility for inadvertent errors or omissions.

H. DEWEY ANDERSON

Executive Secretary

Temporary National Economic Committee

PERCY E. DAVIDSON

Professor of Education

Stanford University

STANFORD UNIVERSITY, CALIFORNIA

August 26, 1940

CONTENTS

CHAPTER	PAGE
I. INTRODUCTION	1
II. OCCUPATIONAL TRENDS IN AGRICULTURE	71
III. FORESTRY AND FISHING	100
IV. EXTRACTION OF MINERALS	115
V. MANUFACTURING AND MECHANICAL INDUSTRIES	131
A. Administrative and Service Group	159
B. Building Trades	167
C. Electrical Workers	187
D. Lumber and Furniture Industries	194
E. Clay, Glass, and Stone Workers	205
F. Iron and Steel Workers	222
G. Metals Group	240
H. Leather Industries	253
I. Textile and Clothing Industries	263
J. Paper, Printing, and Allied Industries	298
K. Food Industries	313
L. Cigar and Tobacco Workers	336
M. Chemical and Allied Industries	343
N. Miscellaneous Group	367
VI. TRANSPORTATION AND COMMUNICATION	375
VII. TRADE	435
VIII. PUBLIC SERVICE	468
IX. PROFESSIONAL SERVICE	493
X. DOMESTIC AND PERSONAL SERVICE	560
XI. TRENDS IN CLERICAL OCCUPATIONS	584
INDEX	601

LIST OF CHARTS

CHART	PAGE
1. Distribution of Gainfully Employed, by Occupational Categories, 1870-1940	ii
2. Increase in Population and in Gainful Employment, by Occupations, 1940 over 1870	22

CHART	PAGE
3. Percentage of Total Population Gainfully Employed, by Occupational Groups, 1870-1940	25
4. Number of Workers Gainfully Employed, by Occupational Groups, 1870-1940	32
5. Percentage of Gainfully Employed, by Occupational Groups, 1870-1940	33
6. Gainfully Employed Workers, by Occupational Groups, 1930	34
7. Gainfully Employed, 1870-1940	35
8. Estimated Labor Force of the Future, 1940-1980 . .	36
9. Gainfully Employed Workers, by Occupational Groups, 1930	65
10. Gainfully Employed Workers, by Occupational Groups, 1930	66
11. Gainfully Employed Workers, by Occupational Groups, 1930	67
12. Gainfully Employed Workers, by Occupational Groups, 1930	68
13. Gainfully Employed Workers, by Occupational Groups, 1930	69
14. Gainfully Employed Workers, by Occupational Groups, 1930	70
15. Production, Man-Hours, and Output per Man-Hour in Rubber Tires and Tubes Manufacturing, 1920-1936	140
16. Production, Man-Hours, and Output per Man-Hour in Agricultural Implements Manufacturing, 1920-1936	140
17. Production, Man-Hours, and Output per Man-Hour, Iron and Steel Group, 1920-1936	141
18. Production, Man-Hours, and Output per Man-Hour, Rayon Industry, 1920-1936	141
19. Man-Hour Productivity in the Auto Industry and in 59 Manufacturing Industries, 1919-1935	142

CHAPTER I

INTRODUCTION

A. THE STUDY OF OCCUPATIONAL TRENDS

Why Study Occupational Trends?

Fundamental to any properly devised vocational educational program are the study of the human material to be trained, a broad appraisal of the occupational needs of society, and a consideration of the long-term and short-term shifts in production, processing, manufacturing, and service which determine the supply of and the demand for labor. The study of occupational trends is essential to show the shifts in occupational emphasis and in the use society makes of its workers.

The standard of living of well over 90 per cent of all families is determined by the gainful employment of one or more of its members. A man's occupation exerts a most powerful influence in assigning to him and to his immediate family their place in society, in deciding their place of residence, and in determining the occupational status of the children¹ when they enter employment. The work a man does to earn his livelihood stamps him with mental and physical traits characteristic of the form and level of his labor, defines his circle of friends and acquaintance, affects the use of his leisure, influences his political affiliations, limits his interests and the attainment of his aspirations, and tends to set the boundaries of his culture. In a word, except for those few persons whose way of life and future are secured and fixed by the inheritance of great wealth, occupation is the supreme determinant of human careers.

Occupational trends not only mark historic moments in our development but also indicate the direction our economy is taking. To the social scientist, a study of employment trends reveals much valuable information. The numerical distribution of workers at regularly spaced periods of time permits of comparisons which picture the effect of social and economic changes. Combined with the related descriptive

¹ Percy E. Davidson and H. Dewey Anderson, *Occupational Mobility in an American Community*, Stanford University Press, 1937.

material from industrial history such numerical data take on new significance.

The Nature of the Census

The study of occupational trends is more complicated than first appears. No single set of figures is adequate to picture statistical trends, and any such information has to be compared with other and sometimes little related sets of facts before the whole story can be set forth. It is also frequently necessary to treat the data by different methods in order to view them from as many tangents as possible.

The only accessible figures on the number of workers in the United States are those taken by the Federal Census at ten-year intervals. The census is an enumeration based upon answers given by individuals who are interrogated by officially appointed and temporarily employed census takers. These enumerators follow prescribed forms and make a house-to-house canvass within a certain period of time fixed by the Census Bureau in Washington. The Census of Occupations, which is made up from data secured by these canvassers, is consequently neither an industrial census nor an employment record. It classifies those enumerated on the basis of their "usual occupation," or the occupation at which they are "customarily employed." Thus, the census of "gainful workers," "gainfully employed," or "gainfully occupied," as it is variously referred to, must be considered strictly as an approximate picture taken at a given time of the available labor force of the nation.

The occupational census cannot be regarded as a distribution of employed persons, for it does not indicate anything about the amount of daily, weekly, or seasonal employment, the working hours, or other conditions of their labor. The 1930 census included an enumeration of unemployed according to the occupational classification of the census. It was taken on the downward trend of business following the 1929 collapse; but it does not record the number of unemployed in the trough of the depression. According to it, a total of 3,138,000 workers were unemployed, which was 6.6 per cent of the national labor force. The average for males was 7 per cent; the range was from 1.6 per cent among agricultural operators to 21.5 per cent among coal-mine operatives. For female workers the average unemployment was 4.6 per cent, the range

being from 2.4 per cent in transportation and communication to 10.7 in manufacturing industries.²

The census is strictly an occupational listing for any given occupation or group, and includes all workers in that occupation irrespective of industry. For 1910 and 1930, however, the Census Bureau did make a segregation of the summary data on occupations by type of employment of workers within industries, so that an industrial classification is available for those two decades. Comparisons between them are made later in this chapter.

The Census of Occupations is not a qualitative measure of the potential labor force of the nation. For example, it makes no effort to distinguish between a fully trained carpenter and one who may call himself a master carpenter while in reality rendering only helper's services in the carpentering trade. It does attempt, however, to distinguish certain grades of labor in industry, listing helpers, apprentices, and "operatives" (the latter being a collective name for machine tenders and other workers who are considered by the census classification to be primarily of the semiskilled, routine type).

One of the most difficult problems met in the present study of trends has been to reconcile the classifications of the various censuses so that workers in successive decades could be grouped by occupational titles having substantially the same meaning.

Data on sex and age groups have been included in the Census of Occupations since 1870. However, various census directors have differed in their ideas concerning the presentation of the data in the published accounts. Likewise, public policy concerning child labor has been changing. For these reasons, the age range of "ten years of age and over" has been chosen for this study; for in earlier censuses of the last sixty years a very considerable portion of gainful workers were children of ten years and older. Using the other possible base line, "sixteen years and older," would exclude occupational data on young workers in a number of states even today.

The Census of Occupations has changed its classification and definition of occupations in successive decades, tending toward improvement in the assembly and interpretation of data. More complete information concerning a growing num-

² Ralph G. Hurlin and Meredith B. Givens, *Recent Social Trends in the United States*, McGraw-Hill Company, New York, 1933, p. 316.

ber of specific occupations is furnished in the censuses since 1900 than is available for previous recordings. The major categories also have been altered somewhat to secure more homogeneous groupings. Such changes have complicated the task of presenting trends since 1870.

In order to secure true trends of a given body of workers it has been necessary in some instances to lift whole groups of workers out of previous census classifications and to place them elsewhere. Great care has been exercised in doing this, however, and footnotes have been attached to the tables explaining what has been done.

Census-Taking

While the span of elapsed time between census-taking periods is approximately uniform, the time during the year when the census was taken undoubtedly has had some bearing on the number of workers returned in the various occupations. The census-taking months during the sixty years under review have been as follows:

Census	Month	Census	Month
1870	June	1910	April
1880	June	1920	January
1890	June	1930	April
1900	June		

The 1920 census was taken from three to four months earlier than the other three censuses of this century. With respect to agriculture, the January census occurred during the slack season when the minimum number of hired hands was employed and few seasonal laborers were at work in the harvest fields. The Brookings Institution estimates the understatement due to this cause to be at least 533,290 agricultural workers.³ A major portion of these workers who normally would have been counted in agriculture, had the census been taken in June, were probably listed in other forms of unskilled or semiskilled labor.

There are marked seasonal periods in certain occupations which affect the census figures, as shown in the following data for 1929:⁴

³ Edwin G. Nourse and associates, *America's Capacity to Produce*, Brookings Institution, Washington, D.C., 1934, pp. 496-98. See also chapter II, herein, p. 67.

⁴ *Federal Reserve Bulletin*, November 1930, reported in Paul Douglas and Aaron Director, *The Problem of Unemployment*, pp. 74-77.

Industry	Variations in Employment
Automobile manufacture...	May, 24 per cent more than in December
Women's clothing	March, 35 per cent more than in July
Ice-cream making	July, 41 per cent more than in January
Stoves and furnaces.....	March, 43 per cent more than in June
Millinery	April, 65 per cent more than in July
Fertilizer	April, 137 per cent more than in June
Building construction ⁵	July, 13 per cent more than in March

The Census of Occupations does not indicate anything concerning the shift of workers from one occupation to another. It gives no hint, for example, as to what workers who were engaged in automobile manufacture in the peak month of May 1929 may have been doing in December 1929. Many workers undoubtedly have more than one regular occupation, but only one is counted by the census. Or the census may record as a carpenter a man who is out of work when the census is taken, while listing another carpenter temporarily engaged as a ranch hand as either a carpenter or a farm laborer. Exactly how many such listings the census records cannot be reliably estimated. However, it is likely that the more established trades, professions, and well-defined forms of labor are enumerated with a considerable degree of accuracy, whereas the semiskilled operatives and the unskilled laborers may be such shifting populations, seeking labor in a variety of jobs, that the differing dates of census-taking may materially affect their numbers.

The earlier censuses were taken in a country in which bad roads and scattered populations made the gathering of facts slow and necessarily incomplete. For example, the enumeration of the inhabitants of the United States which included the data on occupations was begun on June 1, 1870, and was not completed until August 23 of that year. The director of the census blamed the delay on the lack of unification of census laws, the poor pay of enumerators (who in some instances were allowed only 2 cents a head), the mileage to be covered (frequently over impassable roads necessitating much horseback travel), the lack of trained enumerators (selected locally and frequently for political reasons), and the fact that the Washington office had little or no supervision or control over the census takers.⁶

⁵ Nourse, *op. cit.*, p. 508.

⁶ *Ninth Census of the United States, 1870, I, xxv.*

INTRODUCTION

The numbers of major categories and occupational groups for each decade from 1870 to 1930 were as follows:

Decade	Major Categories	Occupational Groups
1870	4	338
1880	4	265
1890	5	218
1900	5	303
1910	9	428
1920	9	224
1930	10	213

Thus the occupational census of 1930 listed 213 principal subdivisions within the ten major categories. But the census records now permit examination of occupational data for 534 class designations, many of which contain numerous specific occupations for which statistical trends are not always available in the published census. In 1930, the number of groups and subgroups for each major category appeared as follows:

Category	Groups	Subgroups
Agriculture	3	4
Forestry and Fishing.....	4	8
Extraction of Minerals.....	4	14
Manufacturing and Mechanical Industries..	86	246
Transportation and Communication.....	42	71
Trade	20	72
Public Service	9	15
Professional Service	21	55
Domestic and Personal Service.....	19	37
Clerical Occupations	5	12
Total	213	534

When it is remembered that today the Works Progress Administration Occupational Classification code book lists over 20,000 specific occupations, it can be seen that the census designations in many occupations are not sufficiently sharp for guidance and training purposes. Nevertheless, all gainful workers are included in the census, so that it is necessary to ascertain from census classifications and definitions exactly what is meant by the groupings made. These are available in the several "Instructions to Enumerators" issued by the Census Bureau.

How the Census of Occupations Was Studied

All tabular material presented here has been checked twice by two sets of clerks working separately and at different times. The process of checking was done under a single

supervisor and was followed through with extreme care in a systematic manner. All percentages and other figures, whether taken from the census directly or collected elsewhere, have been verified by mechanical operation. The data have been further substantiated by the authors in their analyses of trends made while preparing the manuscript for publication. While none of these measures nor all of them combined can produce reliable results if the basic data were in gross error, they do insure a minimum of such tabulating mistakes as may occur in a work of this magnitude.

The classification of occupations as developed in the 1930 census was followed where possible; data from previous censuses, wherever they may have been recorded in those documents, were brought together from their respective places and reclassified to conform with the revision of the 1930 census followed here. This, in more than one instance, has altered the census arrangement of occupations used in previous decades and made it difficult to check the data presented here with some of the earlier census groupings. The totals, of course, are identical. When such reclassifications have been made, the shifts are indicated in footnotes in the tables.

The tables cover the decennial censuses from 1870 to 1930. Data are displayed showing the total population of the United States, the total number of gainful workers ten years of age and over, the total number in each occupational category, and, in the case of subgroups within categories, the figures on such class designations.

The percentage columns in the tables indicate what percentage the major category is of the total population and of all gainful workers. When class designations within a category are treated, a further column of percentages is presented to show how the occupation under scrutiny compares with the category of which it is a part. While not as complete as would be desired for a full analysis, such tables give basic information required to reveal occupational trends.

Each category and subgroup is compared with the total population, furnishing a broad base on which to display what is occurring generally. In the cases of certain occupations, physicians, for example, such a comparison is also a measure of need for workers. Consideration of the "total gainfully employed" is of much more significance, because it permits comparisons with the entire labor force.

The authors and their collaborators have been at considerable pains to examine the census tables in order to analyze their meanings and to secure related material which may serve to explain the figures. A definite procedure has been followed as far as possible in making such analyses. The present importance of the occupational class is indicated in terms of its number of workers and its proportion of the total population and of all gainful workers. Besides the decennial development, to make the trends more readily understood, summaries are given by comparing 1870, 1900, and 1930. Only where these larger time spans are supported by decennial data, however, are the figures considered valuable; for results found by comparison of widely separated periods of time—such, for example, as that extending from 1870 to 1930—may lead to most erroneous conclusions, since what actually has occurred in the sixty-year interval may be quite obscured.

To illustrate this important fact: The total labor force in Agriculture numbered 5,919,987 in 1870 and 10,471,998 in 1930, an increase of 76.9 per cent. This might seem to indicate a rapidly growing category. Should new entrants into the labor market be advised to take up farming because agriculture is an expanding industry as shown by the occupational trends just cited? Quite the contrary is the case. For the number of agricultural workers reached its peak in 1910 and has been decreasing ever since. Actually their number in 1930 was only 2.1 per cent more than in 1900. In Table 4, page 16, the estimated figures presented for 1940 show this decrease to be continuous. See also Table 7, page 21, for the decennial percentage decrease from 1930 to 1940.

Many similar instances could be derived from data taken from the census. In fact, the course of occupational trends is quite varied, making it unsafe to form any conclusions from a comparison of two widely separated periods of time.

The decennial percentage increases or decreases of all categories and of their principal subgroups is next compared with that of the total population and of all gainful workers. Thus it can be readily ascertained whether a particular occupation is expanding or contracting more rapidly than is either the population or the national labor force and hence what is its changing role in the national economy.

In the tables on occupations are submitted a total for both

sexes and separate figures for each sex. Also, a summary table is offered for each major occupational category and for the more important subgroups within those categories indicating their sex composition for the decennial censuses since 1870. In these displays the relative importance of each sex and its trends during the past sixty years may be discerned. The interested reader may chart similar trends for all occupations from the basic tables furnished in the treatise.

The census trends of occupations are construed with the help of information derived from industrial history and current economic reports. For example, agricultural workers are compared with the population to be fed, the acreage under cultivation, the production of crops and livestock, and the value of agricultural output. A comparison of trends in number of workers with the need for their products and actual output not only reveals the relative productivity of workers in the successive decades but also permits many pertinent inferences to be drawn concerning adequacy of labor, circumstances of employment, and probable future development.

In the areas of production and processing it is possible to compare the trends of workers with the trends of production and processing; but in the service fields, and in trade and finance, different measures of the specific requirements of the labor force have to be used. For example, trends in the number of physicians have to be compared with the population trends, incidence of disease requiring medical attention, the cost and adequacy of medical care, the fee schedules and net incomes of physicians, the capacity of various levels of the total population to pay for privately administered medical service, the development of group methods of practice and payment, and indications of changes in public policy respecting the number of medical trainees and the social control of health and disease. Only after these diverse and sometimes conflicting elements have been considered, can any safe conclusions be drawn concerning the adequacy of the labor force engaged in the healing arts or can any prediction be hazarded about the future in such occupations.

It is not presumed that the pertinent research into economic history and contemporary studies has been exhaustive. Sometimes available data are too few to present more than an outline of the situation, in which cases it is wise to interpret the occupational statistics with unusual caution. At other

times, while the factual material available is abundant, only a résumé of it has been attempted because of limited space. In any case, the educator or social scientist must consider it essential to a full understanding of occupational trends that he collate the census material presented here with other independent researches before coming to a final conclusion upon which to base decisions as to practical guidance and training programs for prospective workers or upon which to formulate public policy involving the labor force.

B. SUMMARY OF GENERAL OCCUPATIONAL TRENDS

Certain over-all statistics of occupational trends from 1870 to 1930 may be introduced here which should prove helpful before beginning a more detailed examination of the facts relating to the occupational subdivisions of the census in the subsequent chapters of this book.

Primary Divisions of the Population

Hurlin and Givens have compiled a table which aids materially in showing the distribution of the entire population according to the primary activity in which they were engaged. While only an approximation in certain particulars, and although there is considerable overlap in the figures presented, they are offered in Table 1 as descriptive of the situation in general.

TABLE 1
PERCENTAGES SHOWING THE PRIMARY DIVISIONS OF THE POPULATION
OF THE UNITED STATES, 1870-1930*

Division	Percentage						
	1870	1880	1890	1900	1910	1920	1930
Gainful workers	32.4	34.7	37.2	38.3	40.6	39.6	39.8
Children under 5 years...	14.3	13.8	12.4	12.1	11.5	10.9	9.3
Children 5-15 years, idle.	10.7	6.8	6.8	6.7	3.8	3.7	2.9
Persons in school.....	16.6	19.8	18.6	17.7	19.6	20.6	22.7
Housewives	21.3	21.9	21.7	21.6	21.2	21.5	21.3
Adults in institutions....	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Not accounted for.....	4.4	2.6	2.9	3.1	2.8	3.1	3.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Ralph G. Hurlin and Meredith B. Givens, *op. cit.*, p. 274.

The proportion of the population which made up the available labor force of the nation, designated "gainful workers" in the table, increased from 32.4 per cent in 1870 to a peak

of 40.6 per cent in 1910, and then decreased slightly, to 39.8 in 1930. The figures of the table indicate that since 1900 approximately the same proportion of the total population has entered the army of workers who were either actively engaged in producing the goods and rendering the services of our society or sought an opportunity to be included in that working force. This does not mean that the vastly increased production of goods and the more varied and numerous services offered the people in the past thirty years have not required more workers, but it does mean that these advances have been achieved while adding no greater fraction of the population to the available labor force (Chart 7).

When actual numbers are studied, however, the body of gainful workers increased from 12,505,923 in 1870 to 29,073,233 in 1900 and advanced to 48,829,920 in 1930, a gain of 290.5 per cent during the sixty years. Both the proportional trends and the numerical trends relative to the same group must be examined to understand their full significance. Thus, a matter of considerable importance in studying occupational trends is brought to the readers' attention. These two sets of data may reveal different conditions and point to different conclusions.

The proportion of children under five years of age has suffered a slight but steady decline since 1870. The number of children in school has increased and those in gainful labor have decreased sharply especially since 1900. The reduction in child labor is one of the principal reasons for this fact, and is a reflection of changing social standards which may be expected to continue until such time as child labor will entirely disappear. The proportion of the population in school has increased and contributes to the decline in the proportion of the idle youthful population. Educational trends indicate that this situation will probably become more pronounced as educational standards are raised and educational qualifications for occupations advanced. The proportion of the population designated as housewives who are not in gainful employment has remained about the same during the decades under review.

Age and Sex of Gainful Workers

Table 2 shows the distribution of the gainful workers according to sex for the decades since 1870.

The proportion of the population ten years or older comprising the gainful workers in 1870 was 44.3 per cent and by 1930 had become 49.5. Male and female workers had increased substantially in the sixty-year period. But, in proportion to

TABLE 2
GAINFUL WORKERS COMPARED BY SEX AND AGE GROUPS, 1870-1930*

	1870	1890	1900	1910		
Total population	38,558,371	50,155,788	62,622,250	75,994,575	91,972,266	106,710,620
Percentage male	50.6	50.9	51.2	51.1	51.5	51.0
Percentage female	49.4	49.1	48.8	48.9	48.5	49.0
Population 10 years old and over	28,228,945	36,761,607	47,413,559	57,949,824	71,580,270	82,789,315
Percentage of total population	73.2	73.3	75.7	76.3	77.8	78.3
Percentage male	50.5	51.0	51.4	51.3	51.7	51.1
Percentage female	49.5	49.0	48.6	48.7	48.3	48.9
Gainful workers 10 years old and over	12,505,923	17,392,099	22,735,661	29,073,233	38,167,336	41,614,248
Percentage of total population		34.7	36.3		41.5	39.4
Percentage of population 10 years old and over....		47.3	48.0	50.2	53.3	50.3
Total number males.....	10,669,635	14,744,942	18,821,090	23,753,836	30,061,564	33,064,737
Percentage of total population	27.7	29.4	30.1	31.3	32.7	31.3
Percentage of gainful workers	85.3	84.8	82.8	81.7	78.8	79.5
Total number females.....		2,647,157	3,914,571	5,319,397	8,075,772	8,549,511
Percentage of total population	4.8	5.3	6.3	7.0	8.8	8.1
Percentage of gainful workers	14.7	15.2	17.2	18.3	21.2	20.5

* This table is taken from census figures and is not corrected for differences indicated in Table 3.

the total body of gainful workers, males had lost ground, being 85.3 per cent of the total gainful workers in 1870 and but 78.0 in 1930. Females advanced during this period from 14.7 per cent to 22 per cent.⁷

⁷ For a comprehensive survey of the situation of women workers in the country, see *Women in the Economy of the United States of America: A Summary Report*, by Mary E. Pidgeon, Women's Bureau of the U.S. Department of Labor, 1937. See also "Women in Industry," *Fortune*, July, September, 1935; W. S. Woytinsky, *Labor in the United States*, Washington, D.C., Committee on Social Security, Social Science Research Council, 1938, pp. 30-35. For the effects of the depression in forcing women and youth into the labor market see: "The American Labor Market," by M. H. Bickham, *American Journal of Sociology*, January 1938, and "Changes in the Nation's Labor Supply," by J. B. Parrish, *American Economic Review*, June 1939.

Size of Groups Studied

The population under review in this study of all gainful workers in the United States is large, comprising 48,829,920 persons in 1930. The relative importance of the several major categories is indicated in Charts 1 and 6. These charts indicate the occupations whose numerical significance is such that their trends heavily affect the development of the total body of gainful workers in contrast with those whose small numbers have relatively little influence.

Reconciliation of Differences in Figures Reported by the Census

Those who have studied the census on occupations carefully have discovered certain overcounts and undercounts, principally confined to agriculture. In Table 3 the census records are captioned "census" and the statistical revisions "revised." The reader may determine for himself which to use in analyzing the occupational trends. Throughout this book the authors have used the census figures, including in parentheses the statistical revisions wherever they have been considered significant.

The first statistical revision is for an undercount of approximately 1,260,000 persons in the population figures for 1870. This occurred principally in the agricultural areas of the Southern States.⁸ Consequently, when the percentage increase in population from 1870 to 1930 is given, the revised figure becomes 208.3 per cent rather than 218.4 per cent as based on the census figures. The revision is possible only for the total population and cannot be safely broken down for the two sexes. As both the changes for the total population and for the total of gainful workers are in the same direction, namely, in a reduction in the sixty years under review, and as the differences between the original and the revised figures are not large, the changed results are of no great general importance.

There was an undercount of gainful workers in agriculture in 1870 estimated at 425,000.⁹ This makes the increase, from 1870 to 1930, 227.5 per cent rather than the census record of

⁸ *Twelfth Census of the United States, 1900, Special Reports, "Occupations,"* Department of Commerce and Labor, Bureau of the Census, pp. xxxli, xxxlii.

⁹ P. K. Whelpton, "Occupational Groups in the United States, 1820, 1920," *Journal of the American Statistical Association*, September 1926.

TABLE 3
ORIGINAL AND REVISED CENSUS NUMBERS AND DECENTENAL PERCENTAGE CHANGES IN POPULATION,
GAINFUL WORKERS, AND AGRICULTURAL WORKERS, 1870-1930

Decade Ending	Population			Gainful Workers Ten Years Old and Over			Agriculture		
	Census		Revised	Census		Revised	Census		Revised
	Number	Percent- age Change		Number	Percent- age Change		Number	Percent- age Change	
1870.....	38,358,371 ^a	....	39,818,371 ^a	12,505,923	....	12,930,923 ^b	5,919,987	....	6,344,987 ^b
1880.....	50,155,738	+30.1	50,155,738	17,392,099	+39.1	17,392,099	7,663,043	+29.4	7,663,043
1890.....	62,622,250	+24.8	62,622,250	22,735,661	+30.7	23,318,183 ^c	8,451,097	+10.3	9,033,619 ^c
1900.....	73,994,575	+21.3	75,904,575	29,073,233	+27.9	29,073,233	10,248,935	+21.3	10,248,935
1910.....	91,972,266	+21.0	91,972,266	38,167,336	+31.3	{ 37,237,336 ^d (37,242,223) ^d	12,388,309	+20.9	11,453,309 ^d
1920.....	105,710,620	+15.0	105,710,620	41,614,248	+9.0	{ 41,614,248 ^d (42,147,583) ^d	10,665,812	-13.9	{ 10,665,812 (11,198,102)
1930.....	122,775,046	+16.1	122,775,046	48,829,920	+17.3	48,829,920	10,471,998	-1.5	{ -1.8 ^d (-6.4)
1930 over 1870.....	.....	+218.4	.....	.....	+290.5	.....	.....	+76.9	+65.0

^a In 1870 there were 1,260,000 persons from the Southern States added to figure used, *Twelfth Census*, Special Reports—Occupations, p. xxxiii.

^b P. K. Whelpton, "Occupational Groups in the United States, 1820-1920," *American Statistical Association Journal*, XXI, 335-42.

^c Figures for 1890 from *Twelfth Census*, Special Reports—Occupations, p. lxxi.

^d Edwin G. Nourse and associates, *America's Capacity to Produce*, 1934, pp. 496 ff.

^e The authors have made note of this adjustment in the chapter on "Agriculture."

290.5 per cent. The changes made in certain decennial census records do have significance, however. The columns in Table 3 showing the census and the revised figures for the total of gainful workers indicate the nature of such changes.

The census of 1890 probably contained an undercount of 582,222 workers located in agriculture.¹⁰ The census of 1910 contained an overcount of unpaid farm laborers estimated at 930,000 persons,¹¹ and an undercount of farm laborers of 533,290 in 1920.¹² In the chapter on agriculture these revisions are discussed in more detail, as their significance warrants.

Gainful Workers Distributed by Occupational Categories and by Sex (Tables 4-6, Charts 3-14)

The decennial reports on the number of gainful workers indicate how the many thousands of occupations in the national labor force have been grouped within the ten census categories. Tables 4, 5, and 6 warrant reading both horizontally and vertically. Read horizontally they indicate the numerical increase or decrease and the proportion each particular category is of the total body of workers in successive decades. Read vertically the columns show the number and proportion each category is of the total body of workers in a given census.

The analysis of all occupational categories has been made the purpose of the succeeding chapters, each being descriptive of one of these occupational families. Space will not be taken to review their development in detail here.

The proportional increase or decrease of the several types of occupational labor can be readily followed in Table 4. Agriculture, which engaged the attention of approximately half of the gainful workers in 1870, has declined steadily, requiring slightly more than a fifth of all workers in 1930. The other numerically dominant labor unit, Manufacturing and Mechanical Industry, which has so characterized our economy in recent decades, increased slightly in its proportion of all workers from 1870 to 1900, but declined in the years of the greatest manufacturing production since 1900 to a point where it had available for its service approximately

¹⁰ *Twelfth Census of the United States, 1900, Special Reports, "Occupations,"* Department of Commerce and Labor, Bureau of the Census, p. lxxvi.

¹¹ Edwin G. Nourse and associates, *op. cit.*, pp. 497-99.

¹² *Ibid.*

INTRODUCTION

TABLE 4
NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, BY OCCUPATIONAL CATEGORIES,
1870-1940*

Group	1870	1880	1890	1900	1910	1920	1930	1940	1940 over 1870
Agriculture	5,919,987 47.3 (6,344,987) (49.1)	7,683,043 44.1	8,451,097 37.2 (9,033,619) (38.7)	10,249,935 35.3	13,388,309 32.5 (11,458,309) (30.8)	10,665,812 25.6 (11,199,102) (26.6)	10,471,998 21.4	9,271,998 17.5	3,352,011 56.6
Forestry and Fishing	53,196 .4 (.4)	84,734 .5	152,725 .7 (.7)	177,035 .6	241,806 .6 (.6)	270,214 .6 (.6)	250,469 .5	270,469 .5	217,273 408.4
Extraction of Minerals	169,499 1.4 (1.3)	255,737 1.5	396,395 1.7 (1.7)	531,417 2.0	960,804 2.5 (2.6)	1,084,751 2.6 (2.6)	980,199 2.0	1,140,199 2.2	970,700 572.7
Manufacturing and Mechanical Industries	3,463,781 27.7 (26.8)	5,267,079 30.3	7,061,138 31.1 (30.3)	9,054,982 31.1	10,514,805 27.5 (28.2)	12,457,631 29.9 (29.6)	13,630,875 27.9	13,964,875 26.3	10,401,004 300.3
Transportation and Communication	403,274 3.2 (3.1)	582,944 3.4	1,089,161 4.8 (4.7)	1,456,732 5.0	2,510,498 6.6 (6.7)	3,053,783 7.3 (7.2)	3,998,206 8.2	4,874,206 9.2	4,470,982 1,108.7
Trade	573,574 4.6 (4.4)	833,717 4.8	1,476,022 6.5 (6.3)	2,232,771 7.7	3,719,797 9.7 (10.0)	4,418,751 10.6 (10.5)	6,277,574 12.9	7,277,574 13.8	6,704,000 1,168.8

INTRODUCTION

17

Public Service	70,367 .6 (.5)	107,226* .6	185,138* .8 (.8)	200,392* .9	644,705 1.7 (1.7)	897,024 2.2 (2.1)	1,218,257 2.5	1,518,257 2.9	1,447,680 2,057.6
Professional Service	332,179 2.7 (2.6)	543,511 3.1	881,783 3.9 (3.8)	1,148,155 3.9	1,614,012 4.2 (4.3)	1,999,168 4.8 (4.7)	2,927,322 6.0	3,593,322 6.8	3,251,143 978.7
Domestic and Personal Service	1,208,142 9.7 (9.3)	1,522,025* 8.7	2,204,597* 9.7 (9.5)	2,777,610* 9.5	3,342,352 10.1 (10.3)	3,534,604 8.5 (8.4)	5,255,803 10.8	5,412,903 10.3	4,204,661 348.0
Clerical Occupations	311,889 2.5 (2.4)	531,063 3.1	830,311 3.7 (3.6)	1,135,204 3.9	1,631,926 4.3 (4.4)	2,090,769 7.1 (7.0)	3,323,217 7.8	5,591,297 10.5	5,209,408 1,670.3
Census errors	35 ^b				98,322 .3 (.3)	281,741 .7 (.7)			
Total	12,505,923 100.1 (12,930,923)	17,392,099 100.1	22,735,661 100.1 (23,318,183)	29,073,233 99.9	38,167,336 100.0 (37,237,336)	41,614,248 99.9 (42,147,538)	48,829,920 100.0	52,735,000 100.0	40,229,077 821.7

* Totals include occupation figures (for 1920, male and female, 281,741; for 1910, male and female, 98,322) omitted in detail because not comparable with 1930 figures. According to the *Fifteenth Census, 1930*, Volume 4. The figures for 1940 are estimates derived by statistical projections of the 1870-1930 series.

Numbers and percentages in parentheses as shown in Table 3. For somewhat different figures for Agriculture in 1910, 1920, and 1930, see *Trends in Employment in Agriculture, 1909-1936*, WPA National Research Project, Report No. A-8, November 1938, p. 11. These figures are, however, annual averages based on numbers employed at first of each month.

^b Less than .01 per cent.

* Revised figures.

INTRODUCTION

TABLE 5

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS BY
OCCUPATIONAL CATEGORIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Agriculture	{ 5,523,209 51.8	{ 7,068,658 47.9	{ 7,772,603 41.3	{ 9,272,093 39.0	{ 10,581,685 35.2	{ 9,582,666 29.0	{ 9,562,059 25.1
Forestry and Fishing	{ 53,161 .5	{ 84,669 .6	{ 159,402 .8	{ 176,360 .7	{ 241,249 .8	{ 269,541 .8	{ 250,140 .7
Extraction of Minerals	{ 169,452 1.6	{ 256,658 1.7	{ 396,009 2.1	{ 580,418 2.5	{ 960,043 3.2	{ 1,082,365 3.3	{ 979,847 2.6
Manufacturing and Me- chanical Industries	{ 3,068,567 28.9	{ 4,573,887 31.0	{ 5,980,057 31.8	{ 7,621,650 32.1	{ 8,696,574 28.9	{ 10,527,828 31.8	{ 11,734,661 30.8
Transportation and Com- munication	{ 402,606 3.8	{ 581,126 3.9	{ 1,078,211 5.7	{ 1,431,118 6.0	{ 2,395,124 8.0	{ 2,828,809 8.6	{ 3,716,501 9.8
Trade	{ 562,160 5.3	{ 803,764 5.5	{ 1,382,117 7.3	{ 2,028,427 8.5	{ 3,242,907 10.8	{ 3,735,128 11.3	{ 5,801,417 13.9
Public Service	{ 69,953 .7	{ 91,670 .6	{ 105,634 .6	{ 121,683 .5	{ 636,489 2.1	{ 879,758 2.7	{ 1,192,041 3.1
Professional Service	{ 240,062 2.2	{ 367,977 2.5	{ 572,770 3.0	{ 722,506 3.0	{ 958,798 3.2	{ 1,182,216 3.4	{ 1,698,382 4.5
Domestic and Personal Service	{ 256,850 2.4	{ 416,757 2.8	{ 666,684 3.5	{ 966,726 4.0	{ 1,235,441 4.1	{ 1,204,252 3.6	{ 1,766,802 4.7
Clerical	{ 303,588 2.8	{ 499,796 3.4	{ 707,603 3.8	{ 862,857 3.6	{ 1,047,504 3.5	{ 1,540,484 4.7	{ 1,855,364 4.9
Census errors	{ 27 ..a				{ 95,750 .3	{ 281,690 .9	
Total	{ 10,669,635 100.0	{ 14,744,942 99.9	{ 18,821,090 99.9	{ 23,753,836 99.9	{ 30,061,564 100.1	{ 33,064,737 100.1	{ 38,077,804 100.1

* Totals include occupation figures (for 1920, 281,690; for 1910, 95,750) omitted in detail because not comparable with 1930 figures. According to the *Fifteenth Census, 1930*, Volume 4.

a Less than .01 per cent.

the same proportion of all workers in 1930 as it had sixty years before. The proportion of the number of workers in Transportation and Communication multiplied somewhat less than three times during the sixty-year period. By 1930, trade, clerical, and professional workers had assumed a much more important place in our national economy than they had held formerly. It is interesting to note that none of the above trends are reversed by the addition of the 1940 percentages. Note further that the only 1930-40 trend that is reversed is that of Extraction of Minerals.

When numerical trends are examined, it appears that Agriculture advanced from 1870 to 1910 and then decreased to a point in 1930 approximately equal with 1900; Forestry and Fishing advanced until 1920 and then declined in 1930

TABLE 6

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
BY OCCUPATIONAL CATEGORIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Agriculture	396,778 21.6	594,385 22.5	678,494 17.3	976,842 18.4	1,806,624 22.4	1,083,146 12.7	909,939 8.5
Forestry and Fishing.....	85 ... ^a	65 ... ^a	323 ... ^a	675 ... ^a	557 ... ^a	673 ... ^a	329 ... ^a
Extraction of Minerals....	47 ... ^a	79 ... ^a	386 ... ^a	999 ... ^a	761 ... ^a	2,386 ... ^a	352 ... ^a
Manufacturing and Mechanical Industries	375,214 20.4	608,212 26.2	1,081,081 27.6	1,433,332 26.9	1,818,231 22.5	1,929,803 22.6	1,886,214 17.5
Transportation and Communication	668 ... ^a	1,818 .1	10,950 .3	25,616 .5	115,374 1.4	224,974 2.6	281,615 2.6
Trade	11,414 .6	29,953 1.1	93,905 2.4	204,344 3.8	476,890 5.9	683,623 8.0	976,157 9.1
Public Service	414 ... ^a	2,172 .1	4,875 .1	8,119 .2	8,216 .1	17,266 .2	26,216 .2
Professional Service	92,117 5.0	175,534 6.6	309,013 7.9	425,649 8.0	655,214 8.1	866,952 10.1	1,238,940 11.4
Domestic and Personal Service	951,292 51.8	1,118,652 42.3	1,612,836 41.2	1,971,474 37.1	2,606,911 32.3	2,330,352 27.3	3,469,001 32.3
Clerical	8,301 .5	31,287 1.2	122,708 3.1	272,347 5.1	584,422 7.2	1,410,285 16.5	1,973,353 18.4
Census error	8 ... ^a				2,572 ... ^a	51 ... ^a	
Total	1,836,288 99.9	2,647,157 100.1	3,914,571 99.9	5,319,397 100.0	8,075,772 99.9	8,549,511 100.0	10,752,116 100.0

* Totals include occupation figures (for 1920 female, 51; for 1910 female, 2,572) omitted in detail because not comparable with 1930 figures. According to the *Fifteenth Census of the United States, 1930*, Vol. IV.

^a Less than .01 per cent.

to a place only slightly above 1910; Extraction of Minerals reached its peak labor force in 1920 and declined in 1930 to a place somewhat above 1910; Manufacturing and Mechanical, Transportation and Communication, Trade, and Public, Professional, Domestic-Personal, and Clerical services all had more workers in their ranks in 1930 than at any previous census on record. For estimated figures in gainful workers for 1940 see Table 4.

Such summaries conceal many movements within the several categories, some of whose subgroups do not support these general trends. For example, in the declining category of Agriculture is the subgroup of Dairymen—a small group to be sure, but one which numerically and proportionately is

increasing. In the main, however, the trends of the major categories indicate what is happening with respect to their numerically significant subgroups.

Increase of Workers in the Major Census Categories (Chart 2)

These important data permit direct comparison between the several occupational categories, the total labor force, and the total population.

The decennial percentage increase in Agriculture had its maximum for the period under review in 1880 and has followed an uneven trend of decline ever since, diminishing sharply in the last three decades. Extraction of Minerals increased at a much more rapid rate than did the total body of gainful workers from 1870 to 1910, but declined drastically in 1920, and suffered major decreases in 1930 and 1940. Manufacturing and Mechanical pursuits likewise experienced great expansion in the first decade, reached their peak decennial gain in 1880, but since then have experienced a general decline. Transportation and Communication had its largest percentage increase in 1890, experienced another revival which called for a very substantial increase in number of workers in 1910 as a result of newly applied inventions in both communication and transportation, dropped to its lowest decennial gain in 1920, expanded somewhat in 1930, and declined to its 1920 level in 1940. Trade continued to make demands for an ever increasing labor force, the decennial gain being much larger than the gain of the total of gainful workers from 1870 onward. But in the last three decades an appreciable slackening in the rate of growth has occurred in even this significant part of our economy, despite the great stress placed upon business affairs not only to keep the wheels of productive industry moving but to find sales for greatly increased production.

Public service is a recently expanding category which reached a great decennial peak in 1910. But several census reclassifications account in considerable part for this increase. However, the change recorded in 1910 placed the Public Service group on a new and higher level which record it maintained until 1940. Professional Service reached its peak increase in the three decades ending at 1890, and while the decennial increase has been above the rate of increase of the total of all workers since, it has not been so pronounced, except that in 1930 these workers experienced one of the largest

TABLE 7

DECENNIAL PERCENTAGE CHANGE IN NUMBER OF WORKERS BY CENSUS CATEGORIES COMPARED WITH THAT OF THE TOTAL POPULATION AND THE TOTAL GAINFULLY EMPLOYED, 1870-1940*

Census Categories	1870	1890	1900	1910	1930	1940	1940 over 1870
Total population	{ 30.1 (25.9)	24.8 (24.9)	21.8 (21.3)	21.0 (21.0)	15.0 (15.0)	16.1 (16.1)	7.9 232.8
Gainful workers 10 years old and over.....	{ 39.1 (34.5)	30.7 (34.1)	27.9 (24.6)	31.3 (28.1)	9.0 (11.7)	17.3 (17.3)	8.0 321.7
Agriculture	{ 29.4 (20.8)	10.3 (17.9)	21.3 (13.5)	20.9 (11.8)	-13.9 (- 6.9)	1.8 (- 1.8)	-11.5 56.6
Forestry and Fishing.....	{ 59.3	38.5	10.8 .....	.....	11.7 (- 2.2)	- 7.3 (- 6.4)	8.0 408.4
Extraction of Minerals....	51.5	54.4	46.7	65.2	12.9	-16.3	16.3 572.7
Manufacturing and Me- chanical	52.6	34.1	28.2	16.1	18.5	9.3	1.8
Transportation and Com- munication	44.5	.....	33.7	72.3	21.6	30.9	21.9 1,108.7
Trade	45.3	77.0	51.3	66.6	18.8	42.1	15.9 1,168.8
Public Service	33.4	17.8	17.5	396.7	39.1	35.8	25.6 2,057.6
Professional Service .....	.....	62.2	30.2	40.6	23.9	45.4	22.4 978.7
Domestic and Personal Service	27.1	48.5	27.6	32.1	- 8.0	48.7	8.0 348.0
Clerical Service	70.3	56.3	36.7	43.8	80.8	29.8	44.2 1,670.3

* Figures in parentheses are from revised data submitted in Table 3. The percentages for 1940 are derived from figures presented in Table 4.

percentage gains made by any group. Domestic and Personal Service has followed an erratic course, showing high decennial gains in 1890 and 1930, the latter coming after an actual loss in workers in the previously recorded census decade and dropping to 3 per cent in 1940. The Clerical group reached a peak decennial gain in 1920, which came at the end of an erratic development from a previously recorded peak in 1880, dropped again in 1930, and increased greatly in 1940.

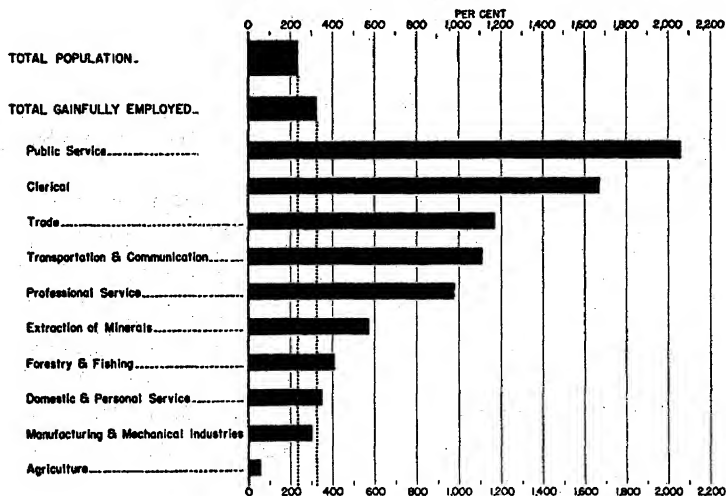
Only agricultural and manufacturing-mechanical pursuits failed to make gains distinctly in excess of the percentage of increase made by all gainful workers from 1870 to 1930; but these two major categories are so large that their decreases pulled down the percentage of gain made by the entire national labor force to a figure considerably below the record of some of the gains made in certain categories. This tends to distort the percentages of Table 7 somewhat; for if the Agriculture and Manufacturing-Mechanical groups are left completely out of the picture, the gain of all other available workers from 1870 to 1930 is raised from 290.5 to 671.7 per

cent. Compared with this new base line, Forestry and Fishing, Extraction of Minerals, and Domestic and Personal Service are found to be among those which failed to maintain their proportionate increase in number of workers.

Judged by either base line, however, certain occupational groups have expanded enormously during the past sixty years. The two groups which show the most phenomenal increases are Public Service and Clerical; but unfortunately their combined numerical proportion of all workers is not great (10.2 per cent in 1930), so that they offer little possibility of taking up the slack in rate of growth caused by decline in Agriculture and Manufacturing or providing for a continued large expansion in the total labor force. Also, public service and clerical pursuits are primarily derivative occupations, largely dependent on basic industries which they serve. They often add little to production and processing and rather than make desirable additions to the total economic output they may become a burden on the economy.

CHART 2

INCREASE IN POPULATION AND IN GAINFUL EMPLOYMENT, BY OCCUPATIONS,
1940 OVER 1870



Technological Unemployment

The data submitted in these tables should prove of interest to those who have seen comparisons of figures on population

growth with those of gainful workers, offered as irrefutable support of the contention that displacement of men by machines has not occurred in the United States. Thus, Ogden Mills, in his *Liberalism Fights On*, shows that the past sixty years represent the period of our greatest technological advance when labor-saving machines were introduced with amazing rapidity. He noted that from 1870 to 1930, while the United States experienced a gain of 218 per cent in population, the gainfully employed increased 290 per cent. He therefore concluded that, despite the technological advance, our economy demanded proportionately more workers than it did in 1870 when much more work was done by hand.¹³

The National Association of Manufacturers has published a series of pamphlets, *You and Industry*, for wide free distribution as part of its national good-will campaign. Number 2, *Men and Machines*, carries the usual message of how machines benefit mankind. Respecting technological displacement, the pamphlet says:

Even admitting the benefit of the machine to the consumer there are serious charges (the machine is responsible for unemployment), requiring factual evidence to bring forth the truth.

What are the facts?

Study the following table carefully. It tells a fascinating story. It describes how between 1870 and 1930, the last census year, while the population increased 218 per cent, those engaged in gainful occupations increased 290 per cent. And that is during the period of the most intensive development of the machine.

Even that usually accurate magazine, *Time*, in the issue of July 26, 1937, succumbed to this surface thinking; for in reviewing William Ogburn's *Technological Trends and National Policy*, this statement is made:

One of the most telling thrusts defenders of science have made against the bogey of technological unemployment is that after half a century of sweeping technological advance a higher percentage of the United States population was gainfully employed in 1930 (40%) than in 1880 (34%).

The fallacies of such reasoning and the errors in the conclusions drawn are easily discerned. In the first place, only two end-points are compared, 1880 and 1930, a comparison

¹³ Ogden Mills, *Liberalism Fights On*, The Macmillan Company, New York, 1936, p. 52. The same, or similar data, and identical conclusions are reached by others who hold strategic positions to mold public opinion. Thus, W. J. Cameron, speaking on the Ford Sunday Evening Hour, December 1, 1935, on the subject "Machines and Jobs," said: "But now that the entire national employment situation for the past forty years has been studied, the fact is established that jobs multiply faster than people during a 'machine age.' The charge that the machine makes fewer jobs is completely refuted."

which obviously conceals much of what took place during the fifty-year interim. If intervening decade reports are inserted, as is necessary to establish a true picture of the trends (see Table 7), it appears that the total of gainful workers increased more rapidly than the total population from 1880 to 1910, but that in 1920 the reverse is true and that in 1930 the rate of growth of the two groups varied only slightly, while that for 1940 was practically even. Thus, if the reasoning advanced by Mr. Mills and the others quoted here is employed, it should be said that no technological displacement was evidenced until the economy of the nation had reached maturity and machine-power development and technological organization had become so generally widespread that their fullest effects could be felt. When this occurred, some time after 1910, it showed itself in a failure of the economy to absorb its usual larger proportion of the increased population into the labor force.

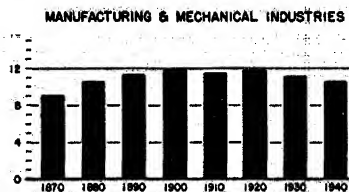
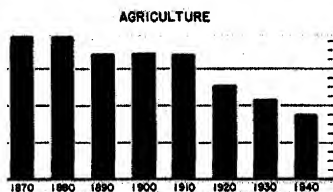
However, while this conclusion is probably in the main correct, it is still dubious for the simple reason that the census figures on occupations are not to be taken literally as a census of employed persons. Only employed persons make the goods, either by machine or hand processes, which represent production. No one knows exactly what proportions of the workers in 1870, or at any other census, were actually employed, partially employed, or unemployed. Consequently it is impossible to tell how many workers were used in the production by largely hand processes in 1870 and 1880, or what proportion of those listed as "gainful workers" in 1930 were employed in modern machine production. Therefore, to say "there was a gain of 20,000,000 new jobs during the period of most intensive technological advancement, 1900 to 1930; for each 1,000 of the 47 million added population, 422 new jobs were created in this period of the twentieth century development"¹⁴ is to make an unprovable statement.

Regarding Table 7 and Chart 3 strictly as portraying the census classification of persons who consider themselves a part of the great army of "gainful workers," either actually employed or desirous of employment, certain important observations can be made which may be helpful in understanding occupational trends. The decennial gains made in the several occupational categories show considerable erratic de-

¹⁴ Allied Products Institute, *Ten Facts on Technology and Employment*, February 1936, Chicago, Ill., p. 3.

CHART 3

PERCENTAGE OF TOTAL POPULATION GAINFULLY EMPLOYED, BY OCCUPATIONAL GROUPS, 1870-1940



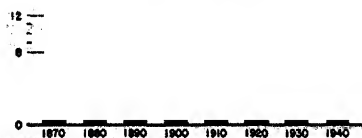
DOMESTIC & PERSONAL SERVICE



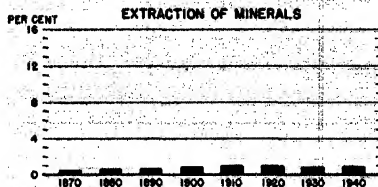
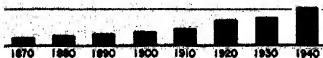
TRANSPORTATION & COMMUNICATION



PROFESSIONAL SERVICE

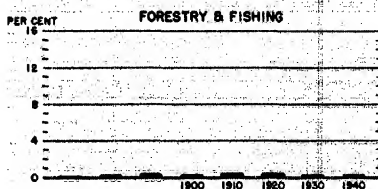


CLERICAL OCCUPATIONS



PUBLIC SERVICE

PER CENT



velopment in all categories. Such trends suggest alterations in economic and social emphasis the full effects of which cannot be ascertained without more complete information concerning our economic and social history.

The occupations concerned primarily with production and processing, with raising and preparing things for consumption and for use in further production, seem to be reaching their maximum demand for workers. Given our present distributive economy, the present level and diffusion of purchasing power, and evidenced technological advances, it appears likely that as many goods as will be consumed or used will continue to be produced with only slight additions to the labor force, and that even these slight additions may disappear as technological improvements displace workers. Agriculture has already gone beyond this condition, using fewer actual workers and also declining in percentage of the total labor force of the nation. The situation has caused competent observers such as Dr. Joseph S. Davis of the Food Research Institute at Stanford University to remark:

There is justification for seeking to make it possible for farmers individually to earn more especially by rendering desired services at lower costs; but frequently an essential condition of increased average remuneration is a reduction in the size of the agricultural group.

The economic adviser to the Secretary of Agriculture said recently: "Even with our present techniques, we have more farmers than we need. Three-quarters of our farmers, that is, 15 per cent of our working population, produce today as much farm products as we are consuming domestically. With even a moderately effective utilization of the methods and machines already known and in use, probably 10 per cent of our workers could produce as much farm products as are now produced, and eventually the proportion will fall even lower. That means that as soon as urban and industrial occupations are ready to employ them, the proportion of farm and industrial workers could be changed from 8 to 2, to 9 to 1, and there will still be ample farm products for everyone!"¹⁵

The manufacturing and mechanical operations, where probably most of the technological advances have been made and are likely to occur, experienced an increase of 50.4 per cent in the number of workers available for labor in these pursuits from 1899 to 1929, but the manufacturing output of that part of the available labor force which was actually employed increased in volume 210 per cent in this period of time.¹⁶

If no better means of providing consumers with an in-

¹⁵ J. S. Davis, *Carver Essays*, Harvard University Press, 1935, p. 16. The "economic adviser" mentioned is Ezekiel Mordecai.

¹⁶ F. G. Tryon and Margaret H. Schoenfeld, *Recent Social Trends in the United States*, 1933, pp. 60-61.

creased buying power is devised than they possessed in the prosperous 1920's, there would appear little possibility, in view of more perfect technology, of experiencing any substantial increase in the number of manufacturing and mechanical workers required to produce that amount of goods which the present or future consumers of the nation can and will purchase.

It must be remembered that the combined categories of agriculture and manufacturing-mechanical occupations engage the attention of half the national labor force, so that what occurs in these major categories has a profound and widespread effect upon all American workers. Because of a combination of forces—personal, social, technological, and economic—it appears that the number of workers required in these major industries is rapidly approaching a static condition. If the present effect of these forces is continued, the result in all probability will be a decline in the number of workers required to produce agricultural commodities and manufactured goods. Then, not only would fewer new entrants be needed to replace workers leaving these industries, but it would be necessary to discharge a portion of the group already employed. The point gains strength when it is remembered that it is based on the census figures which are indicative of the workers available and not of employed persons.

Obviously, such inclusive statements require qualification; for while the foregoing are the over-all trends in agriculture and manufacturing, they are not true for all components of these industries. In some subgroups a shrinking in employment occurred while production was rapidly expanding; in others declines took place in both employment and production; in still others both number of workers and amount of production increased. The reader is invited to examine the detailed material offered in the chapter on agriculture and the chapter on manufacturing and mechanical pursuits to ascertain in which groups these conditions obtained.

The present knowledge of the situation is too meager to permit a comprehensive portrayal of the technological trends in the United States. Certain pertinent observations can be made now, however, as a result of recently assembled data in the National Research Project.¹⁷

¹⁷ National Research Project, *Production, Employment, and Productivity*, in *59 Manufacturing Industries*, Part Two, May 1939, Works Progress Administration, Washington, D.C.

Complete indices of volume of production, number of workers employed, quantity of time employed, and output per man-hour of employment were available in the data for 54 industries. In the peak prosperity year, 1929, these industries employed an average of 4,238,250 workers, or 47.9 per cent of all workers engaged in manufacturing. In 1936, of these industries 35 produced less goods than in 1929, while 19 had experienced an increase in output. In 38 industries the number of workers employed had decreased, while in 16 it had increased. However, this increase in volume of employment was met very largely by reductions in total time employed, for 52 of the 54 industries had reduced man-hours of employment below those of 1929.

In six industries, which together employed only 2.3 per cent of all manufacturing workers in 1929, there was actually a decline in man-hour productivity in 1936 as compared with 1929. In these industries capital structure was shaky, production had declined, and plants were becoming obsolete. In 48 industries, regardless of what occurred in production, number of workers, and hours of employment, the productivity per man-hour was considerably greater in 1936 than in the peak year 1929.

Table 8 displays the combinations of indices found in the manufacturing industry. It is apparent immediately that no single statement concerning technology and its related conditions will suffice. Each industry has its own particular prob-

TABLE 8

PRODUCTION, EMPLOYMENT, AND PRODUCTIVITY IN 54 MANUFACTURING INDUSTRIES, LOSS (—) OR GAIN (+) IN 1936 COMPARED WITH 1929

Number of Industries	Wage earners, 1929		Production		Employment		Man-Hours		Output per Man-Hour	
	Number	Percentage of All Wage-earners in Manufacture	Loss (—)	Gain (+)	Loss (—)	Gain (+)	Loss (—)	Gain (+)	Loss (—)	Gain (+)
24.....	2,208,544	24.99	—		—		—			+
9.....	552,566	6.25		+		+	—			+
3.....	473,008	5.35		+	—		—			+
6.....	203,004	2.30	—		—		—		—	
5.....	749,922	8.48	—			+	—			+
2.....	51,206	0.58		+		+		+		+
Total, 54..	4,238,250	47.95	—35	+19	—38	+16	—52	+2	—6	+48

lems of capitalization, marketing, and technological change. Each is affected in somewhat different fashion by public policy and by general factors in the economy. Yet a characteristic pattern emerges: For 56 per cent of these industries the pattern was one of declines in production, number of workers employed, and period of working time in 1936 as compared with 1929; but technological changes had taken place which resulted in an increased output per man-hour during that time. Nine industries experienced greater volume of production and employed more workers, but worked them for a shorter period of time and at considerably increased output per man-hour. Eight industries produced more goods in 1936 than in 1929, used fewer workers in that production, reduced the number of hours worked, and increased the man-hour productivity.

Five industries showed evidences of a spread-the-work program; for while total production declined and technological changes had increased workers' productivity, the total number of hours worked was reduced and the number of workers employed was increased. Only two of these industries, employing less than .6 per cent of all employees in manufacture in 1929, showed that lusty vigor which characterized the rapidly expanding economy of the pioneering era where the volume of production, the number of workers, the total working time employed, and the techniques of production all increased.

The Shift in the Nature of Occupational Service (Chart 7)

Percentage increases or decreases in gainful workers are better analyzed by a reference to the industrial organization of the labor force. For this reason, the various chapters of this book contain information concerning the total number of wage and salaried workers actually engaged in a given industry, as well as the available labor force as indicated by the census. In this section certain information is presented for the entire industrial economy of the nation.

A marked shift in emphasis on the kind of work done has occurred from 1870 to 1930. In 1870, three-fourths of all workers were related to the production of physical goods in agriculture, mines, factories, lumber camps, or building industries. Only one-fourth were available for the services demanded by society in the professions, the semiprofessions, and the distributive trading and serving occupations. By 1930,

conditions had altered to the extent that approximately half of all workers in the enormously increased national labor force were attached to the production side of our economy. The other half were used in rendering services, distributing goods, or conducting the many business operations which had developed in the effort to capitalize and manage the business structure. In 1850 there were four producers to every distributor; by 1930 one distributor was necessary to dispose of the goods raised by each producer.¹⁸

A useful analysis of these changes has been made by Bingham,¹⁹ who classified occupations according to the functions they performed, as follows:

1. Primary production—of raw materials
2. Processing—converting raw materials into tools or consumption goods
3. Transporting—of raw or finished products
4. Trading—merchandising, financing, exchanging goods
5. Administering or managing—of business enterprise
6. Serving—meeting consumers' personal needs or fancies

While the total population of the United States had increased 33 per cent from 1910 to 1930, the number of workers engaged in the combined branches of production, processing, and transporting increased only 6 per cent, and the physical volume of goods which passed through their hands increased 86 per cent. During these twenty years, service occupations in trading, managing, and personal or professional care expanded 50 per cent. The forms of work which cater to the personal health, education, recreation, adornment, pleasures, and social needs of the population have become increasingly characteristic of our modern economic employment; while the forms of work concerned with the production of raw materials or with converting these raw materials into tools or consumption goods have become less important.

Yet it must be remarked immediately that in spite of the shift which had occurred by 1930 the production-processing fields of labor were still the most important in terms of their

¹⁸ Reported by Daniel Kulp, *Educational Sociology*, 1932, p. 429.

¹⁹ Walter V. Bingham, "Abilities and Opportunities," *Occupations Magazine*, February 1934, XII, 6-17.

use of workers. The 1930 distribution of workers according to economic functions is as follows:

Economic Function	Percentage of Workers
Primary production	24.2
Processing	27.4
Transporting	6.5
Trading	11.8
Administering—managing	11.9
Serving	18.2
	<hr/> 100.0

When viewed as trends these shifts in occupational service take on special significance, for if they continue indefinitely they will assume an increasingly more dominant role in determining occupational careers. But to make recommendations broadly suggesting that more persons should enter the service occupations without first making careful studies of the trends in specific occupations within this classification would be most unwise. This statement is substantiated by the estimates for 1940. Note the distinct decrease recorded for Domestic and Personal Service workers.

While the over-all tendency is for service occupations to expand in comparison with production-processing occupations, there are many promising occupations in the latter field which are also expanding and some occupations in the former which are actually contracting. There are occupations in both groups which offer unusual advantages to new entrants such as favorable working conditions and above-average remuneration and security. There are likewise occupations in both groups which are most undesirable in terms of working conditions, pay, tenure, and opportunity for advancement. Only a detailed analysis of each classification within the larger occupational families can suffice for guidance and training purposes.

It was noted earlier in this chapter under the heading "Nature of the Census" that industrial comparisons may be made only between 1910 and 1930. For those two decades persons within the total body of gainful workers were grouped not according to occupational designations but with respect to the particular industries in which workers were found. Thus a stenographer is not listed under the category of "clerical workers" as in the Census of Occupations, but is placed in the particular industry where he or she is custom-

INTRODUCTION

CHART 4

NUMBER OF WORKERS GAINFULLY EMPLOYED, BY OCCUPATIONAL GROUPS,
1870-1940

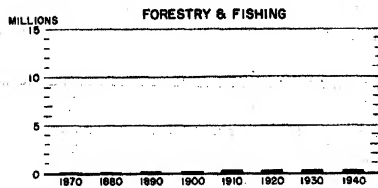
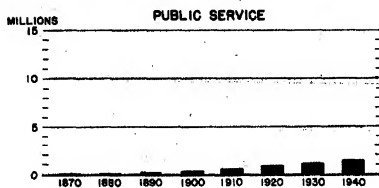
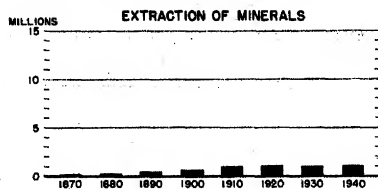
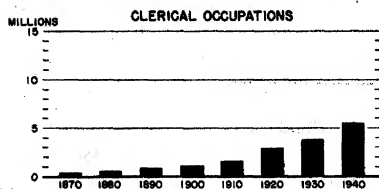
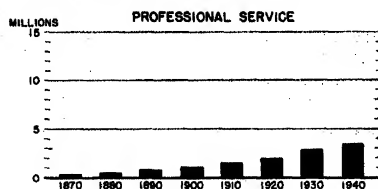
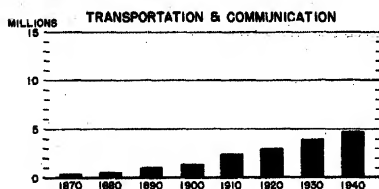
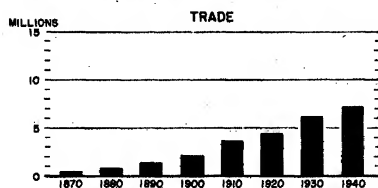
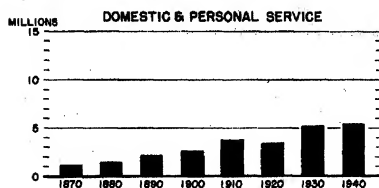
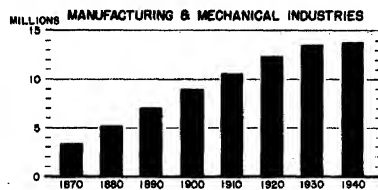
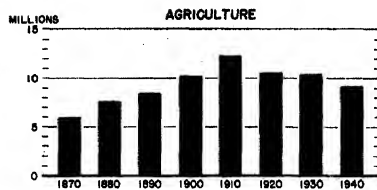


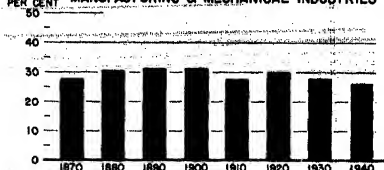
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PERCENTAGE OF GAINFULLY EMPLOYED, BY OCCUPATIONAL GROUPS,
1870-1940

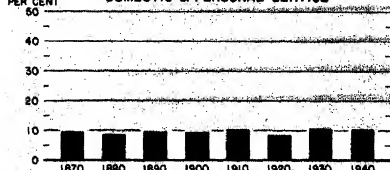
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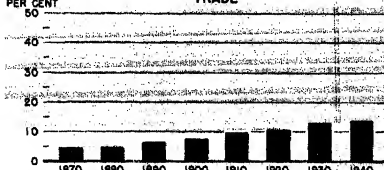
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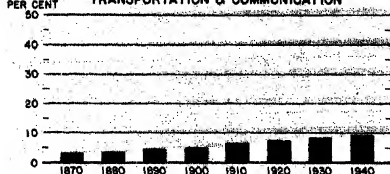
DOMESTIC & PERSONAL SERVICE



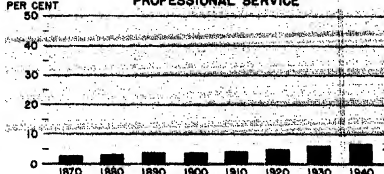
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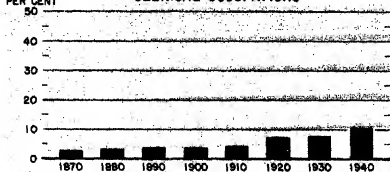
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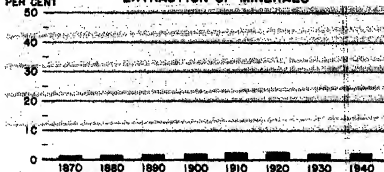
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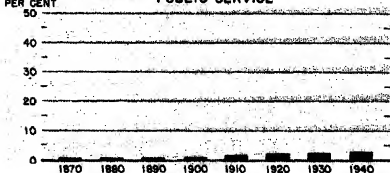
CLERICAL OCCUPATIONS



EXTRACTION OF MINERALS



PUBLIC SERVICE



FORESTRY & FISHING

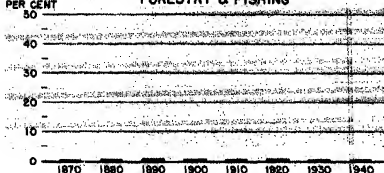


CHART 6
GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930

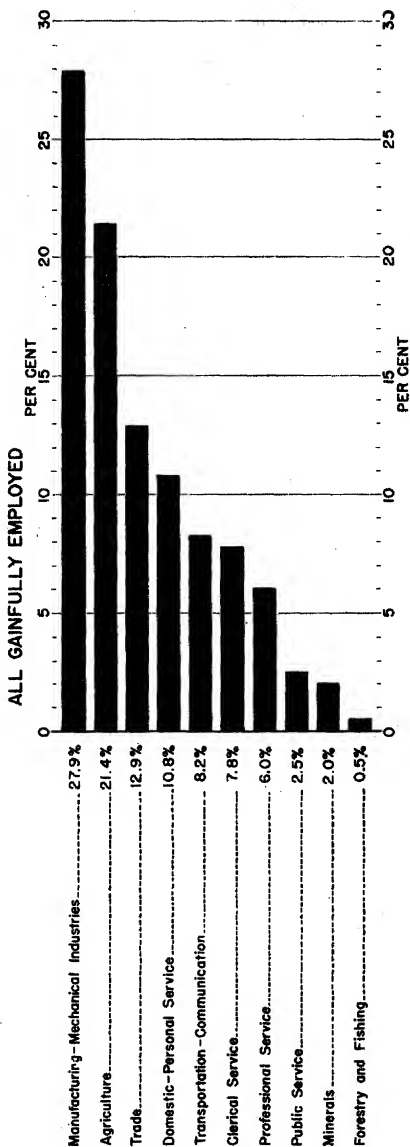
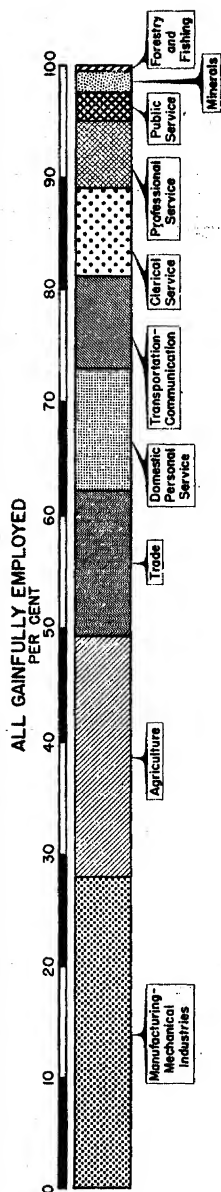
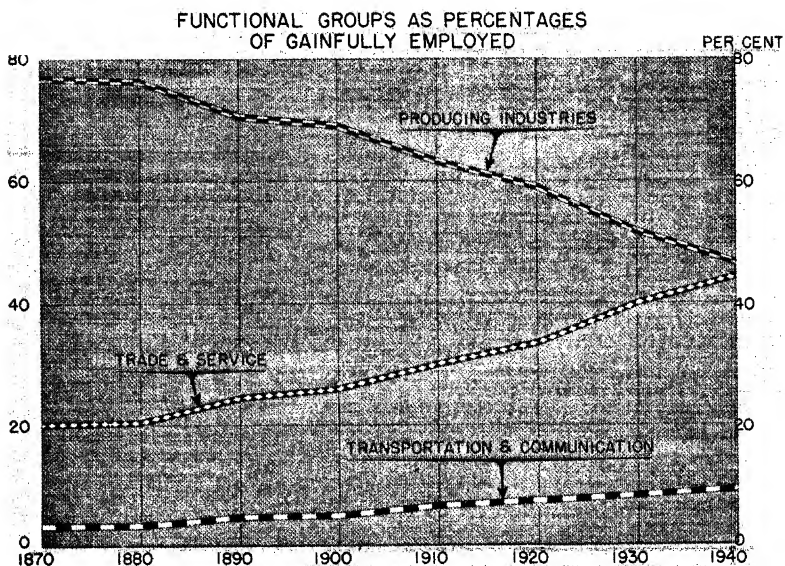
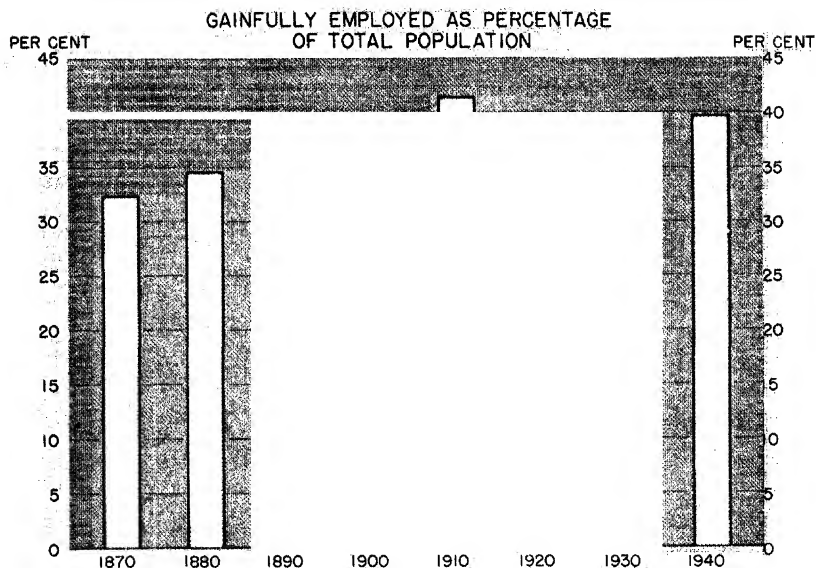


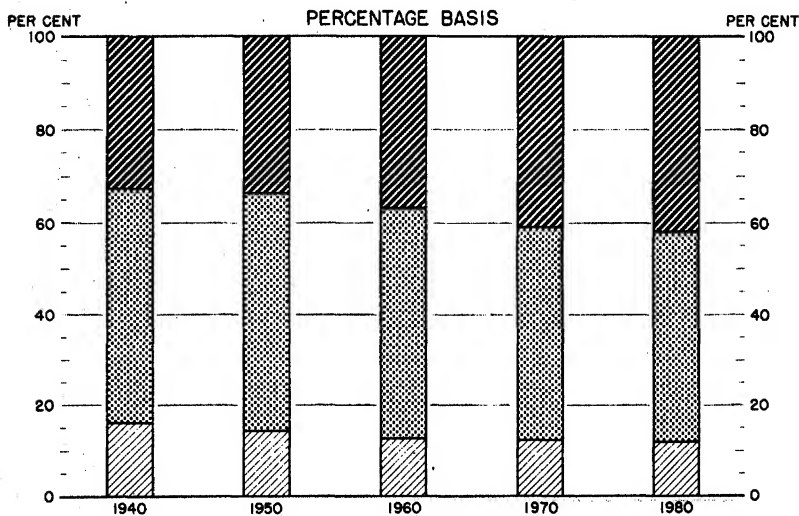
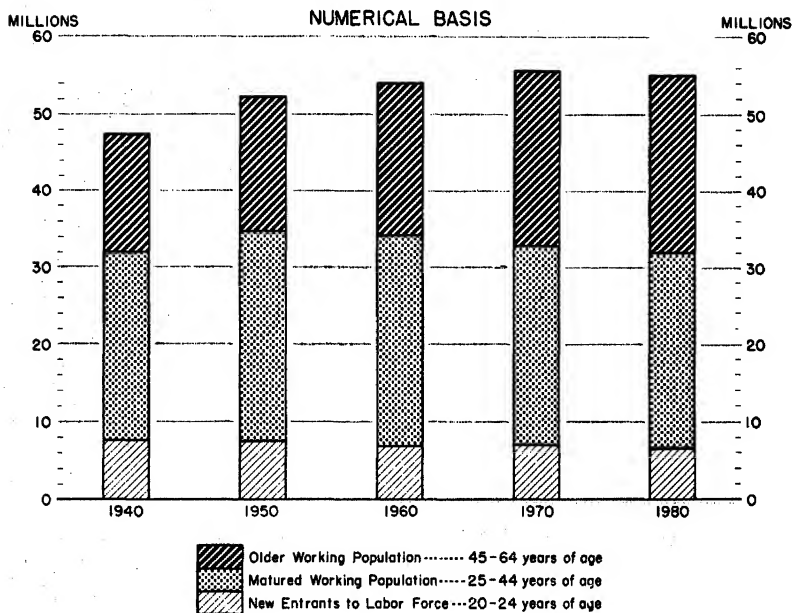
CHART 7
GAINFULLY EMPLOYED, 1870-1940



INTRODUCTION

CHART 8

ESTIMATED LABOR FORCE OF THE FUTURE, 1940-1980



arily employed. Stenographers, consequently, will be found in a variety of industries, many of which are quite unlike in character, although as stenographers their occupational activities are similar. The available data for 1910 and 1930 are presented in Table 9, in which is included, for purposes

TABLE 9

NUMBER AND PERCENTAGE COMPARISON OF THE GAINFULLY EMPLOYED BY MAJOR CATEGORIES ACCORDING TO THE INDUSTRIAL AND THE OCCUPATIONAL CLASSIFICATIONS OF THE CENSUSES FOR 1910 AND 1930

Group	Industrial Classification				Occupational Classification			
	1910		1930		1910		1930	
	Num- ber	Per- cent- age	Num- ber	Per- cent- age	Num- ber	Per- cent- age	Num- ber	Per- cent- age
				Per- centage Change 1930 over 1910				Per- centage Change 1930 over 1910
Agriculture	12,419,046	32.5	10,483,917	21.8	12,388,309	32.5	10,471,998	21.4
Forestry and Fishing	246,647	.6	268,992	.6	241,806	.6	250,469	.5
Extraction of Minerals	1,059,961	2.8	1,156,377	2.4	960,804	2.5	980,199	2.0
Manufacturing and Mechanical Industries	10,875,228	28.5	14,341,872	29.4	10,514,805	27.5	18,620,875	27.9
Transportation and Communication	3,199,070	8.4	4,438,413	9.1	2,510,498	6.6	3,998,206	5.2
Trade	4,327,014	11.3	7,530,064	15.4	3,719,797	9.7	6,277,574	12.9
Public Service	532,753	1.4	1,049,576	2.1	644,705	1.7	1,218,257	2.5
Professional Service	1,712,489	4.5	3,408,947	7.0	1,014,012	4.2	2,927,322	6.0
Domestic and Personal Service	3,795,133	9.9	4,814,573	9.9	3,842,352	10.1	5,255,803	10.8
Clerical Occupations					1,631,926	4.3	3,829,217	7.8
Census error					98,322	.3	.....	.....
Not specific industries and services								
			1,337,689	2.7				
Total	38,167,336	99.9	48,131,270	100.0	38,167,336	100.0	48,829,920	100.0
				+27.9				+27.9

of comparison, a display of both occupational and industrial distribution of gainful workers.

When these two methods of classification are compared it is found that clerical workers among the industrial categories, along with a minor number of other occupational groups who are also spread throughout the industries, do not greatly change the percentage composition of the categories. The trade group in the industrial classification gains slightly more by the addition of clerical workers than do the other categories. When broad categories are considered, the occupational classification of the census serves quite well as either a strictly occupational or as an industrial display of gainful workers.

It will be noticed at once that the industrial classification of gainful workers includes only nine groups, whereas the occupational classification has ten. The clerical group disappears in the industrial grouping, being distributed among the other divisions of industry. When analyzed both industrially and occupationally, it appears that the labor force in only one major category, namely Agriculture, has declined in the twenty years from 1910 to 1930. Industrially, as occupationally, the dominant groups are Agriculture and Manufacturing-Mechanical. Trade, Domestic-Personal Service, and Transportation-Communication are also numerically significant.

A comparison of 1910 and 1930 according to the industrial classification shows some significant changes in the proportions of the groups making up the labor force of the nation. In the short space of twenty years Agriculture has declined from 32.5 per cent of all workers to 21.8 per cent. All other categories have made gains. The gain for the total labor force was 27.9 per cent. Therefore, to have maintained the relative proportion, an industrial group must have made a gain of this amount. The greatest gain of all was that of Professional Service, amounting to three and one-half times the gain of the entire gainfully employed. Public Service gained almost as much. The gain of Trade was 74 per cent, somewhat less than three times that of all gainful workers. Transportation and Communication made more moderate gains amounting to about one and one-third times that of all workers. Manufacturing and Mechanical Industries and Domestic and Personal Service almost kept pace with all workers, while Forestry and Fishing and Extraction of Minerals fell distinctly short of this.

Geographical Importance and Distribution of Occupations

It has already been indicated that any assembly of national trends obscures, if it does not conceal, the trends in occupations pertaining to certain industries and to different parts of the country. Sometimes an occupation is the dominant form of labor in a circumscribed area, so that anything which occurs in that occupation affects the entire life of the community. Such is the case, for example, with certain bituminous coal-producing areas in West Virginia and Kentucky, where the whole countryside is affected by the stagnation of the coal industry.²⁰

²⁰ Homer L. Morris, *The Plight of the Bituminous Coal Miner*, University of Pennsylvania Press, 1934.

In other instances many workers in a given locality are engaged in employment which depends for its existence upon economic influences at work in remote sections of the country. This is especially true of those workers engaged in financial and stockbrokerage occupations in New York and Chicago, where the volume and character of business depends in considerable part on the prosperity of industry throughout the United States. In some instances such occupations are directly dependent upon a particular branch of our economy. The activities of the Chicago Board of Trade are illustrative of this, resting in the last analysis upon the amount and character of agricultural production in those sections of the Middle West, South, and West where particular types of agriculture predominate.

An approximation indicating the amount of agreement in occupational trends of widely separated parts of the country has been made by comparing the occupational census for 1910 and for 1930 in the states of California and Pennsylvania. These states are quite dissimilar in many ways: They are at opposite sides of the continent; one is highly industrial, the other largely agricultural; one is densely populated, the other much less so; one is old in the nation's history and the other new. California and Pennsylvania probably represent extremes of differences in occupational trends to be found in the United States. How they compare in occupational trends appears in Table 10.

TABLE 10
COMPARISON OF CALIFORNIA AND PENNSYLVANIA OCCUPATIONAL TRENDS
1910 AND 1930*

Degree of Similarity	Number of Major Categories	Number of Specific Oc- cupational Groups	Percentage of Total
Identical	2	30	27.5
Very similar	6	44	43.2
Unlike	2	32	29.3
			<hr/> 100

* In making these comparisons the procedure was as follows: The trend of each category and specific occupational group was determined independently for each state. If the trends of both, for example, showed an equal increase in proportion of workers during the twenty years, they were considered "identical"; if the trends were in the same direction and approximately the same, they were called "very similar"; if the trends were not in the same direction they were declared "unlike." The table portrays somewhat better than rough approximations of the situation.

Thus, since these states are more unlike than most, it appears that national trends in over 70 per cent of the instances are either identical or quite similar. If comparisons are made between the 1920 and the 1930 census, then identical or quite similar trends are noted in these two states in 76 per cent of all occupations reported in the census.²¹

Vertical Classification of Occupations (Table 11)

The classifications of the census do not provide an adequate picture of the vertical arrangement of workers. Yet such an arrangement is essential wherever it is desired to group workers according to ascending levels which measure relative occupational competency, economic or social status.

A substantial body of scientific knowledge has been amassed which, by using differences in occupations as a measuring scale, purports to show various educational, social, and economic distinctions between people. All such studies are suspect for the reason that no scale has yet been devised which will enable an investigator to grade, with a high degree of accuracy, the more than 20,000 different occupations in which American workers engage. Despite this fact, the need for an understanding of the vertical arrangement of workers has been felt in vocational guidance and training, and prospective workers have been roughly scaled in terms of their observed characteristics, their social-economic circumstances,²² and some more or less vague notions of the supply and demand of the labor market for the various grades of labor.

The one occupational scale so far devised which can be readily compared with the census classification of workers is that of Dr. Alba M. Edwards, Director of the Census of Occupations in the Census Bureau.²³ This divides all workers into six major divisions and nine subdivisions, as shown in Table 11.

²¹ A valuable paper by Kenneth Evans on "Some Occupational Trends in the South," in *Social Forces*, December 1938, calls attention to significant regional differences in the distribution of workers among the principal occupational categories, especially the professional. The paper is suggestive of interesting possibilities in the further study of regional and state differences and trends.

²² See the discussion of this topic by the present authors in *Occupational Mobility in an American Community*, Stanford University Press, 1937, chapter I, also their article "Are Edwards' Social-Economic Levels Economic?" in *School and Society*, July 30, 1938, pp. 153-56.

²³ Alba M. Edwards, "A Social Economic Grouping of the Gainful Workers in the United States," *Journal of the American Statistical Association*, XXVIII (1933), 377-87. See also his more recent bulletin with the same title, Bureau of the Census, 1938.

TABLE 11

GAINFUL WORKERS IN THE UNITED STATES CLASSIFIED INTO SOCIAL-ECONOMIC GROUPS BY SEX, 1910-1930*

Group	Number			Percentage of Total			Percentage Change 1930 over 1910 ^a
	1910	1920	1930	1910	1920	1930	
TOTAL	38,167,336	41,614,248	48,829,920	100.0	100.0	100.0	+27.9
1. Professional Persons	1,632,638	2,050,162	2,945,797	4.3	4.9	6.0	+80.4
2. Proprietors, Managers, Officials...	8,579,746	9,180,583	9,665,540	22.5	22.1	19.8	+12.7
a) Farmers (owners and tenants)	6,132,380	6,387,360	6,012,012	16.1	15.3	12.3	-2.0
b) Wholesale and retail dealers...	1,246,077	1,401,849	1,787,047	3.3	3.4	3.7	+48.4
c) Other proprietors, managers, and officials	1,201,289	1,391,374	1,866,481	3.1	3.3	3.8	+57.0
3. Clerks and Kindred Workers	3,826,959	5,704,970	7,949,455	10.0	13.7	16.3	+107.7
4. Skilled Workers and Foremen	4,364,060	5,570,602	6,282,687	11.4	13.4	12.9	+44.0
5. Semiskilled Workers	5,512,344	6,638,615	7,977,572	14.4	16.0	16.3	+44.7
a) In manufacturing	3,674,302	4,357,451	4,557,993	9.6	10.5	9.3	+24.1
b) Other semiskilled workers	1,838,042	2,281,164	3,419,579	4.8	5.5	7.0	+86.0
6. Unskilled Workers	14,251,589	12,469,316	14,008,869	37.3	30.0	28.7	-1.7
a) Farm laborers	6,205,633	4,186,128	4,392,764	16.3	10.1	9.0	-29.2
b) Factory and building construction laborers	2,659,917	3,136,276	3,374,143	7.0	7.5	6.9	+26.9
c) Other laborers	2,821,526	2,890,738	2,903,065	7.4	6.9	5.9	+2.9
d) Servant classes	2,564,513	2,256,174	3,338,897	6.7	5.4	6.8	+30.2
MALE	30,091,564	33,064,737	38,077,804	100.0	100.0	100.0	+26.5
1. Professional Persons	913,866	1,061,791	1,497,934	3.0	3.2	3.9	+63.9
2. Proprietors, Managers, Officials...	8,183,563	8,757,614	9,159,896	27.2	26.5	24.1	+11.0
a) Farmers (owners and tenants)	5,859,238	6,121,783	5,749,367	19.5	18.5	15.1	-1.9
b) Wholesale and retail dealers...	1,178,049	1,322,075	1,675,193	3.9	4.0	4.4	+42.2
c) Other proprietors, managers, and officials	1,146,276	1,313,756	1,735,336	3.8	4.0	4.6	+51.4
3. Clerks and Kindred Workers	2,744,488	3,511,808	4,877,235	9.1	10.6	12.8	+77.7
4. Skilled Workers and Foremen	4,267,327	5,469,048	6,201,542	14.2	16.5	16.3	+45.3
5. Semiskilled Workers	3,326,830	4,375,995	5,448,158	11.1	13.2	14.3	+63.8
a) In manufacturing	2,032,346	2,689,245	2,881,022	6.8	8.1	7.6	+41.8
b) Other semiskilled workers	1,294,484	1,686,750	2,567,136	4.3	5.1	6.7	+98.3
6. Unskilled Workers	10,655,490	9,898,481	10,893,039	35.4	29.9	28.6	+2.2
a) Farm laborers	4,679,926	3,382,899	3,746,433	15.6	10.2	9.8	-19.9
b) Factory and building construction laborers	2,571,215	2,966,841	3,248,622	8.5	9.0	8.5	+26.3
c) Other laborers	2,903,596	2,859,343	2,871,744	9.3	8.6	7.5	+2.4
d) Servant classes	600,753	679,398	1,026,240	2.0	2.1	2.7	+70.8

* Alba M. Edwards, "A Social-Economic Grouping of the Gainful Workers of the United States," *Journal of the American Statistical Association*, December 1933.

^a This column added by the authors.

It will be observed that the fourth, fifth, and sixth levels in this scale relate roughly to degrees of exactingness in occupational competency, while levels one to three concern occupational groups whose relative exactingness of performance is unknown. For example, a common laborer in the sixth level of this classification performs routine tasks re-

INTRODUCTION

TABLE 11 (Concluded)

Group	Number			Percentage of Total			Per-centage Change 1930 over 1910*
	1910	1920	1930	1920			
FEMALE	8,075,772	8,549,511	10,752,116	100.0	100.0	100.0	+33.1
1. Professional Persons	718,772	988,371	1,447,863	8.9	11.6	13.5	+101.4
2. Proprietors, Managers, Officials...	396,183	422,969	505,644	4.9	4.9	4.7	+27.6
a) Farmers (owners and tenants)	273,142	265,577	262,645	3.4	3.1	2.4	— 3.8
b) Wholesale and retail dealers...		79,774	111,854	0.8	0.9	1.0	+64.4
c) Other proprietors, managers, and officials	55,013	77,618	131,145	0.7	0.9	1.2	+138.4
3. Clerks and Kindred Workers.....	1,082,471	2,193,162	3,072,220	13.4	25.7	28.6	+133.8
4. Skilled Workers and Foremen.....	96,733	101,554	81,145	1.2	1.2	0.8	—16.1
5. Semiskilled Workers	2,135,514	2,262,620	2,529,414	27.1	26.5	23.5	+15.7
a) In manufacturing.....	1,641,956	1,668,206	1,676,971	20.3	19.5	15.6	+ 2.1
b) Other semiskilled workers.....	543,558	594,414	852,443	6.7	7.0	7.9	+56.8
6. Unskilled Workers		2,580,835	3,115,830	44.5	30.2	29.0	—13.4
a) Farm laborers	1,525,707	803,229	646,331	18.9	9.4	6.0	—37.6
b) Factory and building construction laborers	88,702	169,435	125,521	1.1	2.0	1.2	+41.5
c) Other laborers	17,930	31,395	31,321	0.2	0.4	0.3	+74.7
d) Servant classes	1,963,760	1,576,776	2,312,657	24.3	18.4	21.5	+17.8

quiring little training and limited skill, while a skilled artisan uses intricate tools and precision instruments in following involved plans for construction work. The latter is obviously doing work markedly superior to the former, and is scaled above him in the Edwards' classification of occupations. How far he is above the former worker, or by what criteria the distance he is above him is to be judged, are as yet undetermined, though important, considerations.

However, in the case of clerks, etc., to use an example from the upper three levels, the work does not demand a definite, circumscribed performance calling for a single grade of labor or a single level of competency. The term "clerk" includes a great variety of workers with duties unlike in quality.²⁴ Similar differences are found in all three upper levels, and probably in all the levels of the scale to some degree, so that Edwards' classification cannot be regarded as a completely reliable vertical occupational scale.

Table 11 has been arranged by Edwards, using this scheme of vertical classification for the last three decades. In order to show the amount of gain in the number of persons in each

* W. V. Bingham, "Classifying and Testing for Clerical Jobs," *Personnel Journal*, XIV (1935), 163-72; see also House Document No. 602, 70th Congress, 2d Session, Personnel Classification Board, *Report of Wage and Personnel Survey*; H. F. Clark, *Life Earnings in Selected Occupations in the United States, 1937*, p. 104.

group in 1930 over 1910, the last column showing the percentage increase has been added.

To have maintained its position in comparison with the increase in the total of gainful workers, an occupational level would have had to gain 27.9 per cent from 1910 to 1930. The entire proprietor level and the unskilled-labor level failed to keep pace with this general increase. In the proprietor level the numerically dominant group, farm owners and tenants, actually declined, and their decrease largely determined the trend for the entire level. Wholesale and retail dealers and managers and officials within the proprietor level experienced an increase substantially greater than that of the entire labor force.

Within the unskilled level the dominant group, farm laborers, actually declined in the last twenty years, and the general class of unskilled laborers designated "other laborers" increased slightly. These two groups account for the fact that the unskilled level failed to keep pace with the general trend of increase in gainful workers. The gain in factory and building-construction laborers fell slightly behind the gain of all workers, while the servant class increased at a slightly more rapid rate than the total labor force.

The greatest gain of any level was made by "Clerks and Kindred Workers," who increased almost four times as fast as the total of gainful workers. The professional level and the semiskilled workers not in factories also increased rapidly—approximately three times as fast as the total labor force.

If "Farmers (owners and tenants)" are disregarded for the purposes of determining what happened to all other labor, it appears that the gain in number of white-collar workers in the professional, proprietor, and clerical levels from 1910 to 1930 was 5.4 per cent. However, American labor, other than these agricultural workers, is made up predominantly of hand workers; and, when farm laborers are excluded, manual laborers were 69.2 per cent of all workers in 1910 and 63.8 per cent in 1930. White-collar workers comprised 30.8 per cent of gainful workers, exclusive of agricultural workers, in 1910, and 36.2 per cent in 1930. The increase of 5.4 per cent in white-collar workers and a loss of 5.4 per cent in manual laborers from 1910 to 1930, indicates an upgrading of American labor as measured by the Edwards scale.

The decline in the total number of persons engaged in agriculture was 15.6 per cent from 1910 to 1930. In 1910 farm proprietors and tenants were about equal in number with farm laborers. By 1930 the farm proprietor and tenant group had declined only 2.0 per cent; but farm laborers had declined 29.2 per cent, accounting for most of the loss among agricultural workers.

The patterns of the sexes are not identical. The total body of gainful workers increased 27.9 per cent from 1910 to 1930. Males increased only 26.5 per cent, while females increased 33.1 per cent. Both sexes of the entire upper three levels have increased more rapidly than the rate of increase in all gainful workers. In considering the three lower levels it will be noted that both the skilled and the semiskilled male workers increased at a greater rate than did the total male working population and only the unskilled level failed to equal the gain of the male labor force. None of the manual-labor levels of females kept pace with the increase in the total gainful working women. In fact, both the skilled and the unskilled female working levels suffered an actual loss in 1930 as compared with 1910. Mention has been made previously of the overcount of farm laborers in 1910; and, as this applied especially to female workers, it is probable that the loss noted in this group of workers in 1930 is due in considerable part, but not entirely, to census enumeration.

Trends in Age of Gainful Workers (Chart 8)

The shift in the age composition of the national labor force reflects changing social policy and altered economic conditions. Tables 12 and 13 picture these changes in terms of the numbers and percentages of population-age groups gainfully occupied. These changes are also indicated in a percentage distribution of the total gainfully employed by age groups (Table 14).

Child labor was an accompaniment of the industrial revolution and the introduction of the factory system, in which children could tend machines and fetch and carry as efficiently as older persons and were paid much smaller wages. As industrialism fastened itself upon the United States, and as great numbers of immigrants and migrants from the farms flocked to the cities during the last quarter of the last century, the number of children in gainful labor increased rapidly.

TABLE 12

PERCENTAGES OF PERSONS GAINFULLY OCCUPIED, BY AGE AND BY SEX,
1890-1930*

Age	1890	1900	1910	1920	1930
TOTAL					
10-15	18.1	18.2	15.0	11.3	4.7
16-44	57.1	58.4	61.6	61.0	59.5
45 and over.....	52.4	52.0	52.1	52.8	52.1
45-64	55.5	55.8	56.7	58.2	58.0
65 and over.....	41.7	39.0	36.5	34.3	33.2
Unknown	59.5	46.7	49.0	49.4	47.3
MALE					
10-15	25.9	26.1	21.7	16.8	6.4
16-44	90.6	91.8	93.3	93.1	89.2
45 and over.....	90.4	87.9	85.9	86.7	85.9
45-64	95.2	93.4	92.1	93.9	94.1
65 and over.....	73.8	68.4	63.7	60.2	58.3
Unknown	75.8	59.6	60.5	62.1	59.9
FEMALE					
10-15	10.0	10.2	8.1	5.8	2.9
16-44	21.7	23.5	27.8	28.2	29.7
45 and over.....	11.6	12.9	14.4	14.9	16.1
45-64	12.6	14.1	16.2	17.1	18.7
65 and over.....	8.3	9.1	8.9	8.0	8.0
Unknown	30.8	24.2	24.7	28.3	31.8

* Bureau of the Census release, October 31, 1938.

In dealing with percentages of the various age groups who are included among gainful workers it should be remembered that the actual numbers are lost sight of. Thus, in 1900, 18.2 per cent of all children 10 to 15 years of age were among the gainful workers. In 1930 only 4.7 per cent were there. When the numbers of this age group are displayed it appears that in 1880 gainful workers among these children totaled 1,118,354, while in 1930 they were 667,118, a decline of 40.3 per cent. With respect to the more mature gainful workers 16 to 44 years of age, while the proportion of that age group in gainful labor was 61.6 at the peak in 1910 and this proportion dropped to 59.5 in 1930, in 1910 the actual number of workers of this age group was 26,620,049, whereas in 1930 it was 33,491,651.

The proportion of older workers, those above 45 years of age, has held fairly constant throughout the decades. In 1890, the percentage of this age population which sought gainful work was 52.4 per cent, while in 1930 it was 52.1 per cent. For the age group 45-64, the percentage in 1890 was 55.5; in 1930 it had increased to 58.0. Thus, it appears that the pro-

INTRODUCTION

TABLE 13
NUMBER AND PERCENTAGE OF PERSONS IN EACH AGE GROUP GAINFULLY
OCCUPIED, 1920, 1930*

Age	1920											
	Popu- lation	Gainfully Occupied		Others, Per- centage	Popu- lation	Gainfully Occupied	Others, Per- centage	Popu- lation	Gainfully Occupied	Others, Per- centage	Popu- lation	Gainfully Occupied
		Number	Per- centage						Number	Per- centage		Number
10 to 13 years.....	8,594,872	378,063	4.4	95.6	9,622,492				2.4	97.6		
14 years	2,046,265	257,594	12.6	87.4	2,382,385	157,660	6.6		93.4			
15 years	1,861,445	425,201	22.8	77.2	2,295,699	274,130	11.9		88.1			
16 years	1,972,958	778,957	39.5	60.5	2,367,315	587,817	24.8		75.2			
17 years	1,855,173	933,691	50.3	49.7	2,295,822	891,024	38.8		61.2			
18 and 19 years....	3,740,980	2,246,203	60.0	40.0	4,593,279	2,542,213	55.3		44.7			
20 to 24 years.....	9,277,021	5,980,467		36.1	10,870,378	7,147,053	65.7		34.3			
25 to 29 years.....					9,833,608	6,255,677	63.6		36.4			
30 to 34 years.....					9,120,421	5,567,327	61.0		39.0			
35 to 39 years.....					9,208,645	5,619,242	61.0		39.0			
40 to 44 years.....					7,990,195	4,881,298	61.1		38.9			
(25 to 44 years)....	(31,278,522)	(18,996,959)	(60.7)	(39.3)	(36,152,869)	(22,323,544)	(61.7)		(38.3)			
45 to 49 years.....					7,042,279	4,276,070	60.7		39.3			
50 to 54 years.....					5,975,804	3,555,091	59.5		40.5			
55 to 59 years.....					4,645,677	2,640,064	56.8		43.2			
60 to 64 years.....					3,751,221	1,950,528	52.0		48.0			
(45 to 64 years)....	(17,030,165)	(9,904,654)	(58.2)	(41.8)	(21,414,981)	(12,421,753)	(58.0)		(42.0)			
65 to 69 years.....					2,770,605	1,227,042	44.3		55.7			
70 to 74 years.....					1,950,004	642,902	33.0		67.0			
75 years and over..					1,913,196	335,023	17.5		82.5			
(65 and over).....	(4,933,205)	(1,689,737)	(34.3)	(65.7)	(6,633,805)	(2,204,967)	(33.2)		(66.8)			
Unknown		72,722	48.9	51.1	94,023	44,431	47.3		52.7			

* Comparable figures were not obtainable for all age groups for 1920 and 1930. The figures available for 1920 are given in parentheses and comparable figures carried through for 1930.

portion of the older population in gainful employment has increased somewhat. When the numbers of such workers are examined, it will be seen that in 1890 they totaled 4,546,824 but by 1930 they had grown to 12,421,753, an increase of 173.2 per cent. This must not be taken as a refutation of the often noticed and frequently reported fact that older workers are being let out of jobs and find it increasingly difficult to secure employment. While most employment studies record this condition, the census data neither support nor deny these findings of independent employment studies.²⁵ Nor do they permit conclusions such as were drawn from them by Hurlin and Givens²⁶ when they said:

On the other hand, older workers are clinging tenaciously to employment. Contrary to popular supposition, the occupational statistics indi-

²⁵ See particularly the report of the Census of Unemployment of Massachusetts, January 2, 1934, *Labor Bulletin*, No. 171, Massachusetts Department of Labor and Industrial Division of Statistics, November 1934, pp. 11 ff.

²⁶ Ralph G. Hurlin and Meredith B. Givens, *op. cit.*, p. 177.

TABLE 14

PERCENTAGE DISTRIBUTION OF GAINFULLY OCCUPIED BY AGE, 1920, 1930*

Age	1920			1930		
	Total	Male	Female	Total	Male	Female
10 to 13 years.....	0.8	1.4	0.5	0.4	0.7	
14 years	0.5	1.0	0.3	0.3	0.4	
15 years	0.9	1.7	0.6	0.5	0.8	
16 years	1.5	3.2	1.2	1.0	1.9	
17 years	1.8	3.9	1.8	1.5	2.9	
18 and 19 years.....	4.4	9.4	5.2	4.2	8.8	
20 to 24 years.....	12.5	21.2	14.6	12.6	21.8	
25 to 29 years.....			12.8	12.4	14.3	
30 to 34 years.....			11.4	11.7	10.4	
35 to 39 years.....	45.7	47.1	40.1	11.5	45.7	42.3
40 to 44 years.....			10.0	10.6		
45 to 49 years.....			8.8	9.4	6.6	
50 to 54 years.....			7.3	7.9	5.2	17.9
55 to 59 years.....	23.	25.9	15.8	5.4	5.9	3.6
60 to 64 years.....			4.0	4.4	2.5	
65 to 69 years.....			2.5	2.8	1.4	
70 to 74 years.....	4.	4.5	2.3	1.3	4.5	1.5
75 and over.....			0.7	0.	0.4	2.5
Unknown	0.	0.2	0.2	0.1	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

* For the figures from 1890 to 1930 showing minor differences in the percentages for 1920 and 1930, see Bureau of the Census release for October 31, 1938.

cate that a greater proportion of persons in the 45 to 64 age group is now customarily employed than during the Nineties.

What these figures actually seem to imply is that proportionately more of this older age group in the population, and numerically many more such persons than formerly, are now found in the body comprising the available labor force of the nation. Why they are there can only be conjectured, and whether they are actually or even partially employed or for how long a time they succeed in obtaining employment is likewise not fully known. It may be, as some commentators have indicated, that in the 'nineties older persons, while still listed in the census, were able to quit looking for work, either because they had saved a small competency for their old age or because children looked upon the care of their aged parents as a family responsibility. Both of these conditions have altered since that time, so that an increasing proportion of the growing number of older people must still seek some means of livelihood.

The percentage that the gainfully employed workers 65 years of age and over was of the population in this same age group dropped from 41.7 in 1890 to 33.2 in 1930. However, the number of workers above 64 years of age in 1890 was 1,009,053 and in 1930 was 2,204,967. Again, it is difficult to isolate the factors causing this condition.

The Importance of Occupational Income in Distributing Workers

In lieu of scientific means of distributing workers, some economists have short-cut their way to the conclusion that occupational income is the best available index of the adequacy of labor in any given occupation, in the degree that occupational income is established in a free market as a result of the interplay of the forces of supply and demand. Obviously, for many reasons, such a free competitive market does not exist in many occupations whose preferred status is determined not by competition for the jobs available but rather by privileges and protections furnished through social or political means. Thus the very high remuneration of some business executives who receive much more money than do their most important technical or supervisory personnel is not so much the result of competition between persons equally qualified for such position as it is due to relationships of a social character which guarantee them a preferred status. In many instances, to cite other examples in skilled, semiskilled, and even unskilled occupations, unionism effectively maintains wages considerably above the level which would prevail for those degrees of occupational skills if wage rates were established in a free competitive market.

The theory that the wage established in a free market is the best practical measure of a correct use of the labor force holds that there are too few in those occupations where the wage is considerably above average and that there are too many workers in those occupations where wages are much below average.²⁷ To alter these conditions for the greater social good it is held that it would be necessary to remove every barrier to training for occupations, so that, despite differences in economic or social status, all prospective work-

²⁷ Harold F. Clark, *Economic Theory and Correct Occupational Distribution*, Teachers College Publications, Columbia University, New York City, 1931.

ers could achieve training in keeping with their talents. It therefore follows that wage rates in all occupations should be publicized currently and kept ever before workers, both new and old, and that a workable universal system of vocational guidance and counseling, vocational training and placement, and retraining and replacement be adopted.

Occupational income in the real world of economic endeavor is the result of many forces whose relative significance is not fully known—tradition, changing social habits, amount and strength of unionism, the degree of mobility among workers, scarcity or abundance of qualified workers in relation to momentary demand, cost of training and limitations of trainees, cost of living, general economic conditions of prosperity or depression, technological changes either installed or imminent, prevailing concepts concerning the standard of living, and other agencies of more or less influence. Nevertheless, in any one well-defined economic area and at any given moment, relative scarcity is undoubtedly the basic reason for major differences in occupational income. As a consequence, certain occupational services are compensated much above the average, permitting their recipients to enjoy a standard of living and privileges greatly in excess of those afforded other workers. The costs of such services often place them beyond any widespread demand among the people regardless of the social need for them. At the other extreme of the occupational-income scale is found a mass of toilers performing low-grade routine work paying a pittance insufficient to keep want and privation from their families.

In terms of national norms, an occupation whose full-time earnings are above \$1,500 a year is a preferred occupation; one whose income is above \$2,000 is exceptional; one whose income is above \$2,500 is highly favored. Judged in terms of human welfare, any occupation whose net return to the worker is in excess of \$3,000 a year is highly selective, and should hold special attractions for all new entrants to the field of labor.²⁸

How much "room" there is for more workers in the occupations which have preferred incomes depends upon several

²⁸ See The Brookings Institution's study, Maurice Leven *et al.*, *America's Capacity to Consume*, Washington, D.C., 1934; and more particularly Maurice Leven's *The Income Structure of the United States*, Brookings Institution, Washington, D.C., 1938, which gives many figures that indicate the conservative nature of the estimates offered in this text. H. F. Clark, *Life Earnings in Selected Occupations*, 1937, is especially valuable in this connection.

factors whose weight must be determined in relation to specific occupations. For example, it may be that the occupational income of a great business executive is highly artificial, and that, no matter how many persons are qualified to compete on equal terms with him, the noneconomic basis for his income would maintain it by preventing competition to express itself. However, even here, except in unique instances, the presence of comparably qualified persons would tend to inject an element of competition into the situation and probably to prevent further artificial increases in salary, if not actually to bring about a decrease. In times of economic difficulty such competition would seem to have even more opportunity to become effective.

While it is true that the executive and higher business positions are relatively few, there being room, for example, for only one president or executive manager in a given concern, the division of executive functions has by no means reached its maximum for economic effectiveness. The presence of more qualified persons at this level of occupational service should tend to increase the division of labor there.

In the fee-charging fields, such as the medical and legal professions, the presence of undersupply of workers does not determine entirely the high average occupational earnings received; but incomes for these professions undoubtedly reflect such a condition. That there is a superiority of income among such workers which does not derive from their relative occupational competency is probably true. It would appear reasonable to amplify the number of such professional workers in terms of the needs of society for their services at a lower price.

At the skilled-labor levels, unionism has frequently erected barriers to entrance which have resulted in raising the level of occupational income considerably above the general average for wage earners. But here there is some social justification for this procedure because the wages secured are seldom sufficient to provide a comfortable standard of living, and usually mean, at best, only a level of decency for the worker and his family.

The task of obtaining a better occupational distribution obviously is not to take away those reasonable wage-and-working advantages which many occupational groups have won only as a result of long and bitter struggle from an un-

yielding and often antagonistic economic system. It is rather to encourage the flow of new labor toward those favored occupations whose circumstances of employment, comparatively high incomes, and social necessity are evident. As workers are added to these economically important occupations, their labor will tend to swell the national production so that there will be a relatively greater quantity of economic goods and services to distribute among the people and a proportionately larger occupational income with which to buy them.

C. SOME FACTORS AFFECTING OCCUPATIONAL TRENDS

While our present limited knowledge of this highly complicated topic makes it impossible to enumerate all the agencies which determine the course of occupational trends, certain factors have come to the surface during the present investigation which have proved helpful in construing the statistical data. These are summarized below, with a few significant illustrations in each case. Other illustrations will appear abundantly in the subsequent interpretations of the trends for the several census categories.

1. *Public policy.*—There are few if any types of occupational labor which are not subject to legal requirements. One of the methods increasingly used to fix the status of an occupation, to limit its numbers by making qualifications more difficult, and to regulate the conduct of its members is to represent to the lawmaking bodies of the states and the nation that the occupation is intimately related to social welfare or to the health and safety of the public, and thus to argue that it requires governmental regulation.

Departments of Professional Standards are found in most states. Their lists of self-regulated occupational boards are continually growing as more occupational groups acquire some semblance of professional status and seek the advantages of governmental control. The effect of such actions upon occupational trends is discernible in the case of engineers, for example. In the state of California, licenses to engage in the private practice of civil engineering and land surveying (without which no engineer can be in charge of any construction or designing) are issued on an annual basis. Applicants must pass a prolonged examination; renewal li-

censes are issued upon request to engineers in good standing. The number of applications received in 1937 was 6,311; 886 were denied; 29 certificates were revoked during the year for unprofessional practice; and 603 licenses of a restricted character expired and were not subject to renewal.²⁹

An increasing number of health and sanitation, city planning, and zoning laws affect occupational trends. For example, in many communities street hucksters are prohibited and in others the imposition of high license fees greatly restricts their numbers. Building ordinances prescribe the kind and quality of structures, thereby determining in large measure the kinds of construction workers who can be employed. In many areas wooden structures are forbidden, a regulation which limits the share of carpenters in employment caused by the increase of building construction. Plumbing, heating, and lighting regulations prescribe the types of installations allowed and thereby influence the amount and quality of materials and labor used.

An outstanding example of the effect of public policy on occupational trends is seen in the enactment by the Congress of different tariff regulations at various times. Thus, drastic alterations in raw sugar quotas affect the number engaged in growing and harvesting cane and beets for sugar as well as the number of workers in sugar refineries. The correlated change in freight traffic by boat, rail, and highway affects the demand for labor in transportation. Also brokerage firms shift their emphasis and some of their workers, and bankers and mortgage companies experience a difference in their activities. Public officials in the customs and agricultural services, in the Department of Commerce, and in the Treasury have their duties changed somewhat. This whole chain of events follows the shift in public policy as the result of changes in the tariff.

Striking effects of changed public policy on occupational trends followed the enactment of the prohibition amendment. This law abolished legal saloons with their need for bartenders, wiped out overnight the legal wholesaling of beer, almost obliterated the legitimate manufacture and sale of wines and liquors, affected property owners, agriculturists, vineyardists, construction workers, barrel, vat, and container manufac-

²⁹ State of California, *Roster of Civil Engineers and Land Surveyors, 1937-38*, p. 94.

turers, cabinet makers, banks, and mortgage holders. Revisions were made necessary in public services in some communities which depended largely on revenues secured from taxation of liquor enterprises. A whole series of grafting and other unlawful pursuits followed the enactment of this statute. Bootleggers, racketeers, gangsters, and crooks marshaled their forces, and a highly organized and lucrative business was evolved for the illicit manufacture, sale, and distribution of liquor. A great political and public-protection problem resulted and gave employment to a whole corps of new law-enforcement officers and other public servants. This trend developed for almost sixteen years. And then, with the changed public policy culminating in the repeal of the prohibition amendment in 1934, the situation was almost immediately altered, certain occupations disappearing, others reappearing, and new ones emerging.

2. *Technology*.—A major cause of occupational trends is that change or combination of changes in the techniques of management, trade, finance, production, or processing by which the productivity of labor is considerably increased.

In office management technological advances have been made by establishing stenographic pools and dictaphone systems, thereby doing away with the waste of time required for a stenographer to take dictation from an executive at his convenience and in his office. Savings of time and labor costs from this single change have been variously estimated from 10 to 50 per cent of office labor expense. Filing systems have been devised which increase efficiency of workers, reduce enormously the amount and time of clerical work, and permit multiple business practices unheard of formerly.

Economy of labor has been secured in retail stores, offices, banks, and manufacturing plants by systematically planning the floor space in terms of the uses to which it is to be put. Lighting engineers have added considerably to working efficiency by rearranging the lighting of offices and plants to facilitate better vision and to remove eyestrain.

While it is difficult to appraise the exact effect of the technological changes just described, in the fields of production and processing the results of technological changes are much more demonstrable. For example, modern die-casting machines using alloys and operated by semiskilled or unskilled machine tenders have an amazing productivity. One of these

machines costing about \$5,000 and tended by a single operator can turn out 470 pieces a minute. If one such die-caster were kept at work steadily for a year, the machine and its single operator could turn out enough carburetor bowls or radiator caps to supply the needs of the entire world automobile industry for the year.³⁰ Formerly, considerable skill was required of hand molders to make castings, and such forms were of greatly restricted character. Now, the die-casting machine is rapidly degrading the skill of casters, vastly increasing the amount and character of production, and eliminating the skilled molder from industrial production.

Practically all branches of industry furnish instances of this kind. They influence the trends of occupations. But what their immediate and ultimate effects will be depends upon many factors which do not operate alike for all industries or occupations. In some instances, the invention of a new process or the installation of a new machine actually means the complete abolition of an occupation. What occurs to workers who have followed such an occupation depends upon many personal factors such as age, physical capacity and personality, trainability, the nature of the skills they possess, the proximity or distance of their former occupation from other expanding occupations, and general economic conditions. In all recorded instances the abolition of an occupation has brought serious occupational, social, and economic consequences for those whose occupation is destroyed.

In the field of production and processing few occupations can be found which do not face these effects. But the more imminent danger is that technological improvements, while not eliminating the occupation, entirely degrade it from the skilled to the semiskilled routine level. When this occurs, as in the glass-blowing industry for example, workers frequently retain their jobs, and for some time even their old occupational titles, although the skills which they possess are not called upon. A further effect in the glass-blowing industry was to reduce pay from \$1 to 35 cents an hour for those who continued to be employed.³¹

Some technological changes neither entirely eliminate nor degrade workers already in the field affected by the change in

³⁰ Jonathan N. Leonard, *Tools of Tomorrow*, The Viking Press, New York, 1935, p. 144.

³¹ George E. Barnett, *Machinery and Labor*, Harvard University Press, 1926, pp. 110-11.

technique. Consider, for example, carpenters and building masons. In these cases, new tools, new methods of production, new materials, or improvements in management result for the most part in more efficient use of labor, in greater unit output, fewer stoppages, less material loss, and relatively smaller labor costs.

Many highly developed machines today are of the semi-automatic kind which permit the greatest volume of production with the least loss and the employment of low-grade labor working in as routine a way as it is possible for machine-engineers to devise. The next improvement sought in the relentless march of technological advance is an automaticity so complete that it permits the discarding of most machine-tenders and the use of only a few highly skilled mechanics to insure continuous operation of the machinery.

In a wide variety of occupations technology has not even entered the semiautomatic stages as yet. For example, in the building trades, hand skills tenaciously maintain themselves against innovations. Here, labor-saving is accomplished by placing more efficient tools in the hands of artisans, by factory prefabricating of doors, windows, and building materials, as well as by setting up power units on the construction job in order to eliminate hand sawing, cutting, and carrying.

The major purpose of technological improvements is to reduce labor cost per unit of output. Whether it eliminates jobs, opens up new occupations, or expands existing ones depends upon its role in the changing economic situation. If a given industry is expanding rapidly, its product is in considerable demand and more goods are sold as the price is reduced through savings on material and labor. As the output increases, technological changes may or may not displace workers. For example, the Ford Motor Company reports that in a given year during which it installed nine million dollars' worth of new machinery, the number of workers was increased by 40,000 and the payroll advanced by 88 million dollars.³² These figures would indicate that despite all the skill in devising labor-saving machinery of which Ford industrial engineers were capable, even more workers were required. But such gross figures tell nothing about the quality of labor employed as the result of introducing more techno-

³² W. J. Cameron, *Machines and Jobs*, Ford Sunday Evening Hour broadcast, December 1, 1935, p. 2.

logical improvements, about the effect upon productivity per worker, nor whether the increased total wage bill represented a duly proportionate increase of workers' earnings compared to the value added by the manufacture of the larger product, nor whether seasonal or cyclical variations had been taken into account.

Much ado is made over the distinction between "labor-saving" and "labor-serving" machinery. It is urged that no technological unemployment exists in many lines because the new machines or new processes render new services. But only if these services are not in competition, either directly or indirectly, with other commodities which lay claim to a share of the consumer's dollar could they be considered as "noncompeting." The automobile industry is often cited as the classic example. The automobile was an absolutely new invention. Notice its effects: It displaced the horse-drawn vehicle, and it offered direct competition for the share of national income of the stock raiser, the hay and grain farmer, the feed and grain merchant, the horse trainer, the harness- and saddle-maker, the carriage- and wagon-maker, the painter and letterer, the tanner, the upholsterer, the lumberman, the livery-stable keeper, the hostler, the groom, the driver, the railroads, and all their allied workers. In some instances it actually destroyed occupations and permanently displaced thousands of workers. In other cases it transferred workers from one employer to another, permitting them to continue to exercise their old skills. In still other instances it created new occupations or so emphasized old ones as to raise their importance considerably. What the "net effect" of the automobile has been, in terms of occupational trends, is so involved that nothing short of a meticulous analysis of most of the national economy, and even of international economic life, would suffice to determine the full influence. In some instances the results have been highly beneficial; in others they have made drastic reduction in living standards, have degraded skills, and have induced unemployment and insecurity.

After most painstaking study by competent scientists, the National Research Project came to the following conclusion regarding the measurement of technological unemployment:

To measure the full effect of even a single technological change on the displacement and absorption [of workers] would necessitate the virtually impossible task of tracing it through the innumerable factors

which bear upon the total volume of production and employment. Making direct inquiry among employers and workers would not be feasible either, since frequently neither the worker who loses his job nor the employer who lays him off knows whether the lay-off is the result of technological improvements or not.³³

Corey has made the following observation:

. . . . not only is the productivity of labor rising more than production, but technological displacement of workers is aggravated by the downward movement of production, particularly of capital goods legislation [is urged] to tax employers to contribute "toward the relief of the displaced employees until such time as they may be absorbed elsewhere" This proposal might have been of some value in the epoch of the upswing of capitalism, when absorption was greater than displacement. But now, with permanent displacement on a mass scale, it means poor relief for machines neither produce surplus value, nor do they consume. The one is necessary to yield profits, the other to sustain production.³⁴

And Corrington Gill, Assistant Administrator of the Works Progress Administration, summarizes the matter in this manner:

Even during the prosperous twenties, the nation's output of goods and services did not increase rapidly enough to absorb both the labor displaced by increasing productivity and the labor added by the growth and the changing age composition of the population. As for the immediate future, it is estimated that in order for unemployment in 1937 to recede to the 1929 level, the nation's output of goods and services would have to be approximately 20 per cent higher than in 1929 Part of the price of the constant change in the occupational and employment requirements of industry is being paid by workers in the form of unemployment, occupational obsolescence, and readjustments and adaptations to jobs requiring different or lower skills frequently paying lower wages.³⁵

3. *Occupational barriers.*—Frequently these barriers are imposed by professional or other occupational organizations. The old, well-established skilled trades have succeeded so ably that they prescribe the proportion of journeymen's or masters' apprentices permitted, and these conditions are respected by employers. In the professions, too, numbers are limited. The high educational standards for candidates, lim-

³³ David Weintraub and Harold L. Posner, *Unemployment and Increasing Productivity*, WPA National Research Project, Philadelphia, March 1937, p. 49.

³⁴ Lewis Corey, *The Decline of American Capitalism*, 1930, pp. 292-93, 296.

³⁵ Corrington Gill in his letter of transmittal, in *Unemployment and Increasing Productivity*, WPA National Research Project, Philadelphia, March 1937.

ited training facilities, the increasingly more difficult public examinations, the long waiting period before the standard paying practice is established, and the constant surveillance of the professional body over the conduct of its members, all serve to keep the ranks thinned.

There is little support for the belief that only a few qualified applicants can be found who are desirous of securing specialized training. On the contrary, authorities in diverse fields have attested the fact that this country can have many more qualified scientists, professional workers, and skilled artisans, provided occupational barriers to training and employment are removed. Submerged in the mass of workers performing limited service, adding relatively little to national income, are many potentially capable persons whom school authorities, social workers, and examining psychologists have frequently reported as possessed of unusual ability. Were it possible to provide them with the proper training, they could perform much more important service at higher occupational levels.

Judging by the increase of unionism and professional organization, it would appear superficially as though the barriers to occupational advancement are increasing in number and height. But even within these organizations conflict is going on to bring conditions closer to the realities of modern industrial life. In the manual-laboring groups the growing technology which is breaking down craft distinctions tends toward vertical unionism and a departure from the apprentice-master plan of occupational training. There is some reason to believe that semiprofessions and higher supervisory occupations on the skilled level will expand in the face of this technological development, and that many ordinary artisans will be eliminated in favor of semiskilled machine-tenders either degraded from the skilled level, drawn up from the unskilled level, or brought in from the untrained field as new entrants. Occupational barriers are being swept aside in the face of this advancing technology.

In the professional fields a contrary movement seems to be in progress, with further specialization setting up an increasing number of occupations hedged in by barriers inherent in the process of specialization or artificially established as a means of limiting the supply of workers. In medicine, for example, more specialists are reported in practice in the last decade in proportion to the total number of physicians, their

number in 1929 being 44 per cent of all physicians.⁸⁶ In industrial management probably only a small beginning has been made toward the ultimate efficient specialization of supervisory and executive occupations.

4. *"Acts of God."*—Both shifts in occupations of short duration and long-time trends which fundamentally alter the course of occupations are due in considerable measure to "acts of God"—devastating fires, floods, earthquakes, and epidemics which destroy property, uproot families, and change industrial economy in affected localities. Soil erosion or depletion, failure of water supply, changes in the habits of wild life likewise permanently dislocate working populations.

5. *Depletion.*—Whole communities have been brought into being for the purpose of commercial logging of standing timber, and when the timber was depleted these were wiped out just as quickly. Areas surrounding these logging operations have felt the effects of such changes in the shifting occupational patterns of the people. Mining operations have been particularly affected by depletion, and working populations have been drastically changed as these operations have either greatly expanded or declined. The depletion of Southern agricultural fields has forced many farm hands to leave them for industrial communities. With respect to soil erosion a survey of the Department of Agriculture, reported in 1933, had this to say:

Probably a third of the surface of the soil has been removed from one-fourth of the cultivated land of the United States, and . . . a sixth or more of the surface soil has been lost from another fourth of the farm land.⁸⁷

6. *Labor disputes.*—Not only do protracted labor troubles seriously interfere with the earnings of both employers and employees in the industries directly concerned, but their influence radiates to many related industries, especially to those occupations of a seasonal nature which experience sharp curtailment of the working season due to labor difficulties. Any prolonged dispute of this character tends to reshuffle workers into different occupations, and forces many of them to seek new residences and fields of activity.

⁸⁶ I. S. Falk, *Cost of Medical Care*, University of Chicago Press, 1933, p. 205; also *Fifteenth Census of the United States*, "Population," V, 20.

⁸⁷ Report of the President's Research Committee on Social Trends, *Recent Social Trends in the United States*, 1933, p. 96.

The magnitude of this problem of industrial disputes and their effect upon occupational trends may be suggested by certain recently assembled figures on strikes.⁸⁸ In 1929, at the height of economic prosperity, there were 921 strikes, involving 289,000 workers, and resulting in 5,352,000 man-days of idleness. In 1933, in the trough of the depression, there were 1,695 strikes, involving 1,168,000 workers, who lost 16,872,000 working days. In 1936, as recovery manifested itself, there were 2,172 strikes, involving 789,000 workers, who lost 13,902,000 days of labor. But in the first nine months of 1937 there were 3,757 strikes, involving 1,720,000 workers, who lost 25,381,000 working days. Industrial disputes are thus seen to be of considerable importance in their effect upon workers in either good or bad times. Strikes dislodge workers from customary employment and force many to look elsewhere for work.

7. *Alterations in working conditions.*—The limitation of working hours, or the shortening of the work week, may increase the demand for workers and greatly alter the number employed. High wages compared with other occupations and steady employment under favorable working conditions act as a magnet to draw more workers into an occupation thus favorably situated. The reverse conditions operate to drive workers away from unfavorable occupations if general economic conditions offer them opportunities elsewhere.

8. *The business cycle.*—The irregular pulsations of our economy, in which good and bad times alternate, affect the supply of labor in given occupations. The public service becomes especially attractive to persons who regarded such work as mere "time serving" when labor conditions were good and more lucrative employment was available in private service. Contractors who employed others and small businessmen who hire much of their work done during good times begin working at their trades and businesses when times get bad. There are a general stepping down of workers from higher to lower occupations in the face of depression, considerable unemployment on all levels of occupation, and much reshuffling of workers into different occupations as a result of their dislocation from customary forms of work.

During prosperous times there is a marked upgrading of

⁸⁸ Maurice Leven, *The Income Structure of the United States*, 1938, p. 167. See Leven's remarks on the long-run effect of organization of labor on income, pp. 78-79.

workers if the labor supply is limited in any superior level, with many persons possessing restricted qualifications seeking the advantages of these higher positions. If there is an insufficiency of workers in some of the better jobs, these less-prepared persons succeed in securing occupations on the higher levels. Even for those who are not upgraded, the general prosperous conditions provide better occupational circumstances. Workers look more favorably upon unionization and are trained for disciplined action during dull periods. This tends to affect the circumstances of their labor and to protect their occupations from outside attacks.

Were general business cycles immediately translatable into occupational cycles, it would be possible to declare that a business cycle and an occupational cycle are coincidently cause and effect. But they are not always coincident, although they are intimately connected. For example, the building cycle is not identical with the general business cycle; hence not the general business situation but long-run forces at work in economic life cause the building cycle, which immediately affects building tradesmen. While the latter does not operate outside the general business situation, it at least shows itself in a somewhat different time period.

The effect of the business cycle on occupational trends differs considerably according to the particular occupations under review. For example, flour is a staple whose consumption fluctuates somewhat with the rise and fall of the business barometer; but so long as consumers have basic purchasing power they continue to use flour, and the quantity milled per unit of population is somewhat the same. Technological factors, export trade, and tariff policy would seem to have had considerably more effect upon the occupational trends in flour milling than the national business cycle has had, as shown under Food Industries, chapter v.

Contrary to the conditions just described in consumption-goods industries, in the field of luxury goods there is a substantial agreement between occupational trends, purchases, and buying power. Occupational trends in luxury industries are immediately and quite seriously affected by what occurs generally in our economy.

9. *Age and sex composition of the labor force.*—The proportion of the total population which is over 65 years of age is increasing—from 4.06 per cent of our inhabitants in 1900

to 5.40 per cent in 1930—and there is every indication that with more hygienic living and working conditions this trend will continue. The presence of numbers of older persons in the labor market exerts a pressure which is seen in competition that tends to lower wages. This situation may be offset favorably by the extension of old-age pensions. Elimination from their former occupations of workers who reach 45 years of age tends to shift them into the more general categories of semiskilled and unskilled occupations, to swell the already overcrowded ranks of common labor, and to force rates of pay even farther downward.

The barriers against females in gainful labor are rapidly giving way before the stern necessities of modern industrial life. The technological changes sweeping so rapidly over the whole economy make it possible for women and girls to do work comparable with that of men, and their willingness to sell their labor for less gives them an economic advantage which men frequently cannot or will not overcome. Thus, women are displacing men in a continually widening circle of occupations along all fronts of our industrial economy. This movement is comparatively new, dating largely from the war-time period twenty years ago. Its fullest effects have not yet been felt, but enough experience has been gained to indicate that women will increasingly usurp occupations in which men formerly were exclusively employed.

10. *Access to capital.*—Not only does economic circumstance, by excluding many people from the more costly occupations regardless of their individual interests and abilities, act as a motivating factor in selecting an occupation and preparing for it, but capital itself shifts workers from occupation to occupation. Capital, either borrowed or saved, or both, is required in many occupations. When money is easily available, the trends in certain occupations alter as more persons enter them. When capital becomes scarce and relatively few have access to it, more persons are shunted into wage-paying jobs and away from capital-using occupations.

As business organization alters so that in some instances large stocks of goods are held by wholesalers and fed through small retail outlets of independent proprietors, many more persons acquire proprietorships than when large stocks requiring substantial capital investments had to be kept on hand. Thus, many artisans become owner-operators who, were they

dependent upon their own capital for their business operations, would have little access to proprietor status.

11. *Tastes and styles.*—Changes in habits, tastes, styles, and interests of people have a great influence on occupational trends. This influence is at work all the time, making for instability in occupations, and involving major or minor changes among them. When the changed habit is of nation-wide significance, the shift becomes of such importance as to reflect marked changes in occupational trends. Seldom do these great changes occur abruptly.

The smoking habits of women not only have affected the employment of tobacco workers but have created new service occupations requiring the production of accessories to be used in connection with smoking. The reduction in the amount of clothing worn by women lowered the demand for some textiles and placed emphasis on designs and novelty fabric. The shortening of skirts has enlarged the demand for hosiery of silk and rayon. When women changed the style of dressing their hair and began to use more cosmetics, the number of beauty-parlor operatives greatly increased. A whole new occupational field in hairdressing and cosmetology was opened, particularly to women workers. The increased demand for luxury articles to be used in beauty culture brought about a change in employment and the large-scale manufacture of beauty accessories. The expanding use of low-priced ornaments, such as costume jewelry, has also created new industries and new employment.

Changing fashions alone have the effect of making frequent changes in garments, house furnishings, and a great variety of other commodities. A new emphasis on recreational activities has expanded the need for workers in sports goods and allied services. These are but a few examples of innumerable illustrations which come to mind of changing tastes and habits involving shifts in employment.

D. CONCLUSION

The scientific formulation of social policy concerning the training and effective use of the nation's man-power has only just begun. Educators, while accepting increasing responsibility for vocational guidance and training, are still prone to approach the problems involved in terms of their formal aca-

demic training, and with relatively little knowledge of the vocational needs of society or the conditions at work in the labor market. The result is frequently a vague and diffused training in the arts and sciences, which may have value as occupational-training material, but a largely unknown direct influence on occupational competency. Or, when formal vocational training does become specific, as in the case of typing and bookkeeping, it is planned frequently without any regard to the needs of industry, and often, by flooding the labor market in these relatively low-circumstanced callings, causes a reduction in real wages and chaos in the ranks of labor which has been weakened by the influx of many new undisciplined and unorganized workers.

Educators are not alone to blame for the inadequacies of occupational adjustment. Employers and workers have both been slow to develop a consciousness and willingness to approach the problems of supply and demand for workers and the solution of industrial employment in an intelligent manner, making use of all the techniques of the social sciences and the findings of investigations in their efforts to establish a satisfactory occupational situation. The field of personnel problems in their larger industrial aspects is only now being intensively explored.

It appears that this fundamental area of occupational adjustment cannot be fully investigated, or its needs met, until scientific study is broadened considerably—and an adequate mechanism is set up to permit the practical application of suggestions which flow from such findings. An increasing number of competent educators and economists urge the necessity of considerably revamping our training and placement procedures. There is thus great need of more information concerning the trends in gainful workers. These workers represent the available labor supply of the nation. The census arrangement of gainful workers into over 500 occupational groups indicates the self-estimate of the workers concerning their forms of labor. The occupational trends reveal what has happened to the distribution of our man-power over the years. Coupled with facts from industrial history, they help to explain what has occurred. Used with caution, they form the broad basis for predictions concerning the future distribution of the available gainful workers of the nation.

CHART 9
GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930

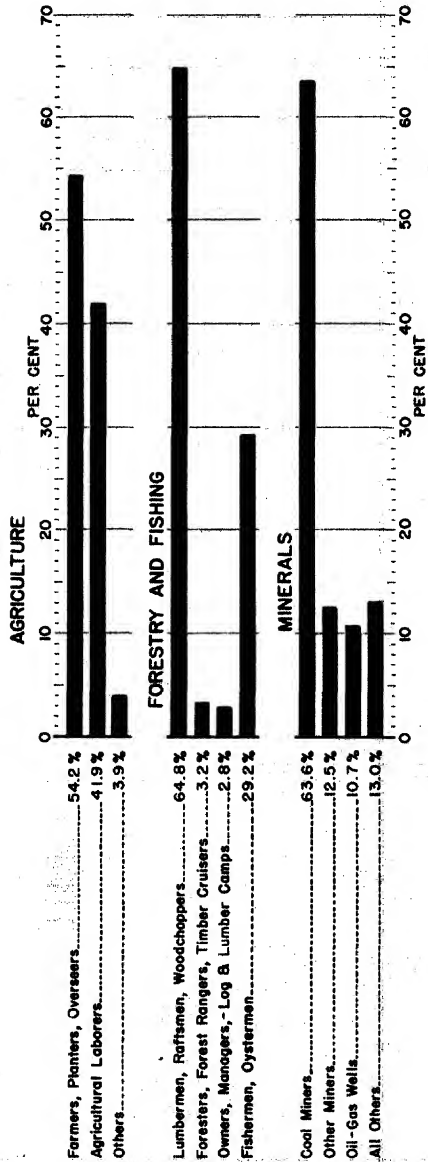
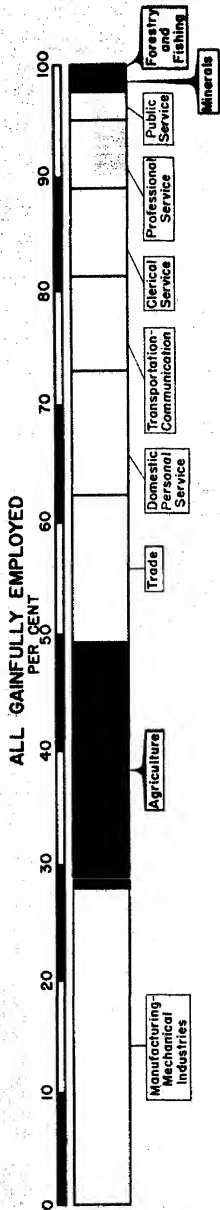


CHART 10
GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930

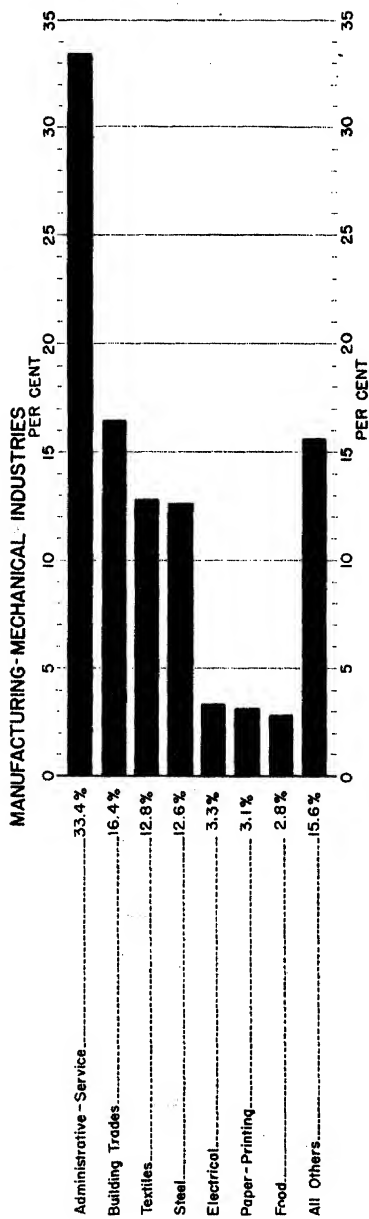
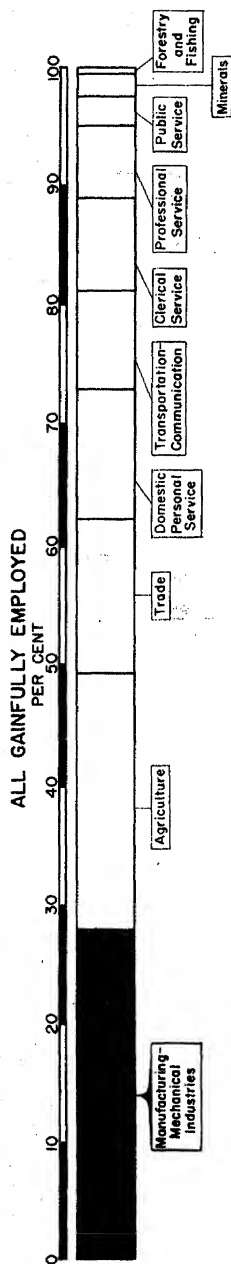


CHART 11

GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930

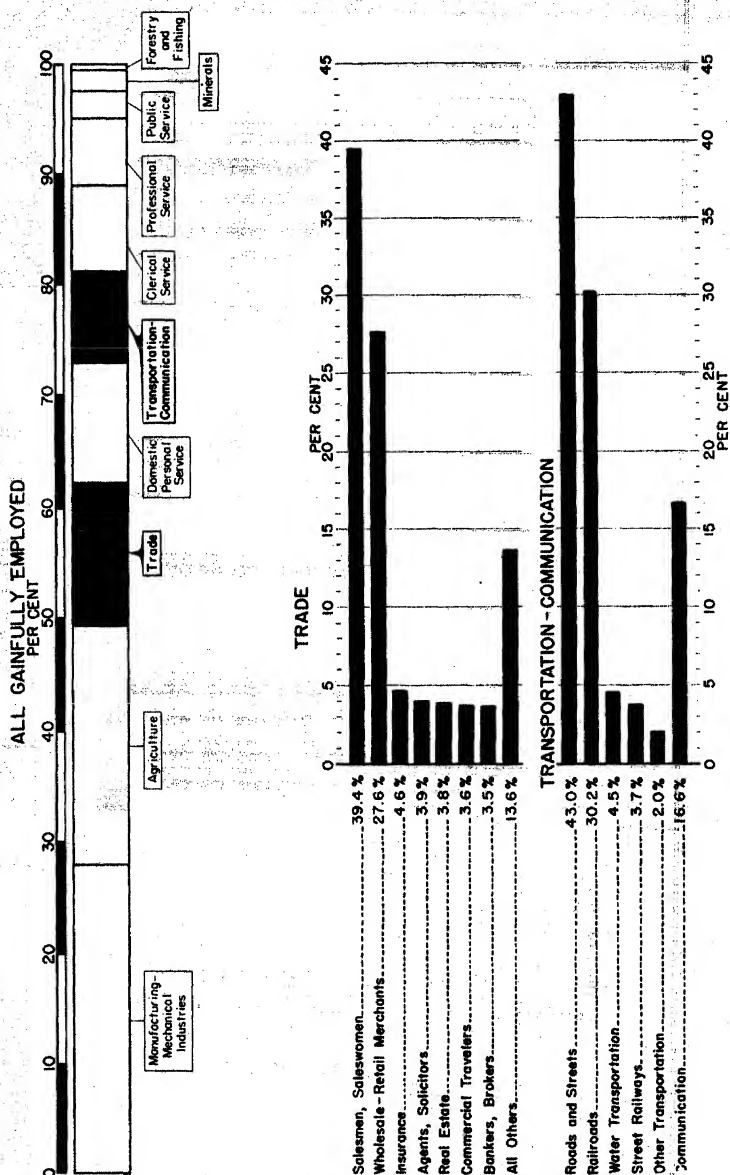


CHART 12.

GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930

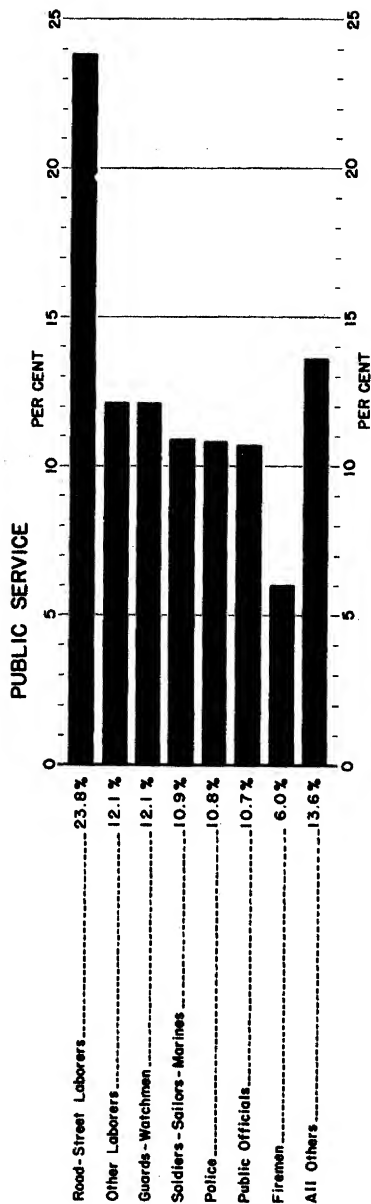
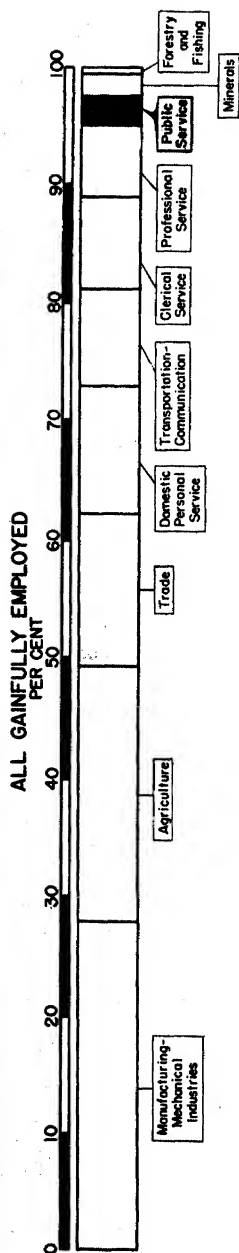


CHART 13

GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930

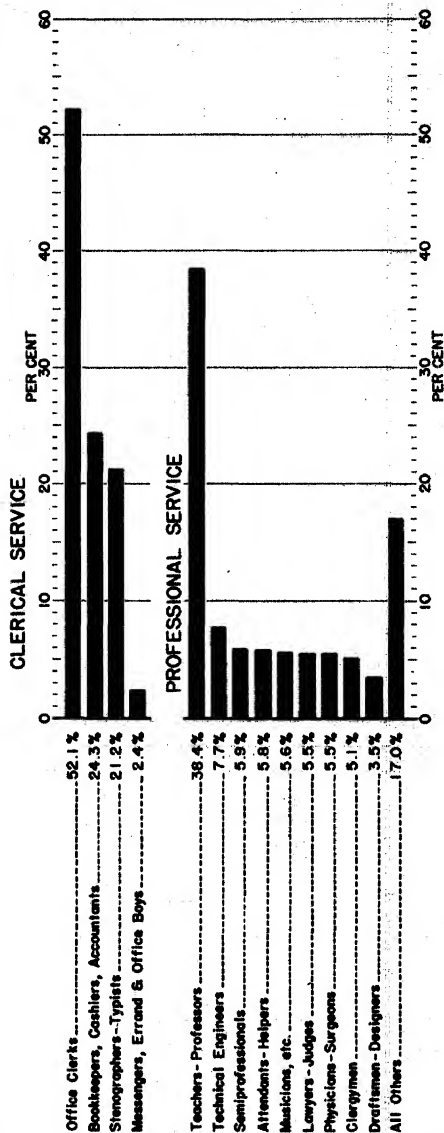
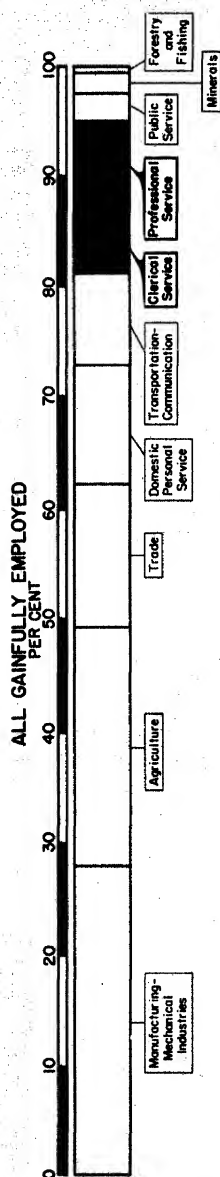
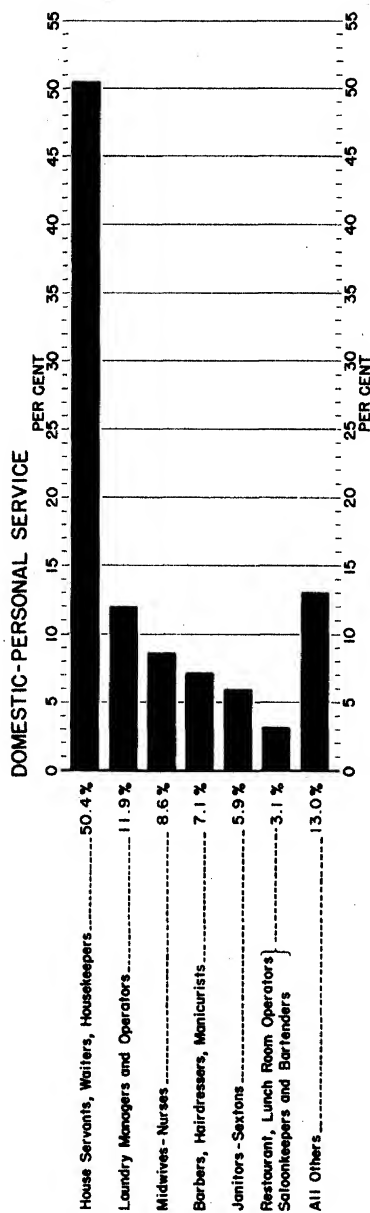
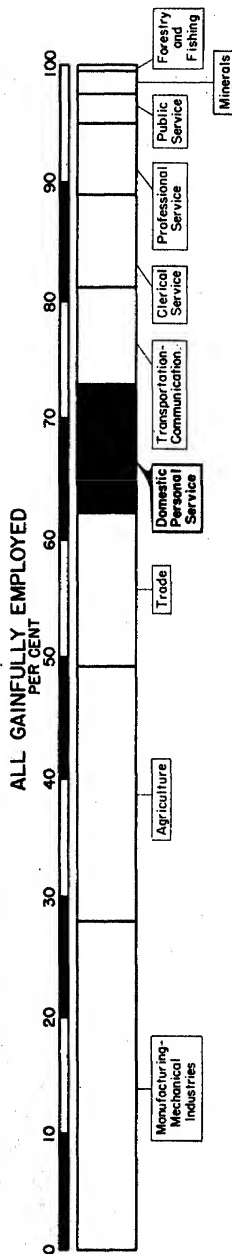


CHART 14
GAINFULLY EMPLOYED WORKERS, BY OCCUPATIONAL GROUPS, 1930



CHAPTER II

OCCUPATIONAL TRENDS IN AGRICULTURE

General Characteristics

Agriculture is affected by both natural and social forces, by events occurring in the immediate vicinity of particular farming communities, and by those taking place in countries many thousands of miles away. Great changes are continually operative in the use of natural resources, in communication and transportation, industrial invention and scientific management, general enlightenment and advancing culture, and in legislative enactment and political organization—all of which have an important bearing on the development of agriculture in the United States. The impossibility of distinguishing sharply among these manifold influences makes the task of ascertaining and explaining occupational trends in agriculture more complicated but no less important.

The Farm Population

Before 1920 the people of the United States were primarily rural; but since that time the trend has been toward a predominantly industrial and urban-dwelling population. Unusual economic disturbances may have momentary or even long-run effects upon this movement of the population. For example, the cityward movement was reversed during the depression year 1932. As a result of this movement, the net gain in farm population since 1932, including the excess of births over deaths, has been very small, as indicated in Table 15. The secondary depression of 1937, however, gave the farm population a net gain of 90,000 people.¹ Despite these facts it is clear that such fluctuations will not reverse the long-run trend away from the farm and toward the industrial community.

A cityward trend of the population is distinctly favored by the much higher reproduction rate in agricultural areas, involving the continual accumulation of surplus population in these areas. Figures indicate a surplus of some 1,200,000 children accumulated in the rural-farm population above replacement needs, during the five-year period, 1925-1929.

¹ *Crops and Markets*, United States Department of Agriculture, June 1938, p. 128.

Such disproportionate accumulation of rural-farm population is likely to continue indefinitely although to a reduced degree. The situation can only be compensated by a constant stream of young migrants from farms to cities as they reach ages of economic productivity. At times of economic disturbance this population movement is likely to be dammed up.²

Another authority states:

Even in 1930 the situation was such that for every man engaged in agriculture who died or reached retirement age, there were two young men on farms reaching maturity and ready to start for themselves. Whether the young people who have been affected by these changing developments will alternately move to cities or whether they will continue to develop farms which produce very little for the market can not be foreseen.³

The movement of the farm population in recent years is indicated in Table 15.

TABLE 15

RECENT LOSSES AND GAINS IN THE UNITED STATES FARM POPULATION*

During Period or Calendar Year	Net Loss of Farm Population	Net Gain of Farm Population
1910-19	463,000	.....
1920-24	784,000	.....
1925-29	661,000	.....
1930-34 .....	.....	1,632,000
1910-34	276,000	.....
1930 .....	.....	328,000
1931 .....	.....	474,000
1932 .....	.....	722,000
1933 .....	.....	77,000
1934 .....	.....	31,000
1935 .....	.....	8,000
1936	80,000	.....
1937 .....	.....	90,000

* *Crops and Markets*, United States Department of Agriculture, June 1938, p. 128.

The size of the farm population for the period 1910-1938 is shown in Table 16.

Comment on these figures by the United States Department of Agriculture is as follows:

Effects of the business recession upon farm population changes were particularly marked in the northern and eastern states where much of the manufacturing is concentrated. In the northern Great Plains states and in the Mountain States where the droughts had been severe there was a continuation of the previously reported decrease in farm population. The Pacific Coast states continued to receive migrants to farms

² F. Lorimer and F. Osborn, *Dynamics of Population*, The Macmillan Company, 1934, p. 36.

³ From "Farm Population Estimates, January 1, 1938," United States Department of Agriculture, Bureau of Agricultural Economics, Release of June 16, 1938, p. 7.

TABLE 16

ESTIMATED NUMBER OF PERSONS ON FARMS, UNITED STATES, 1910-1938,
WITH PERCENTAGE CHANGES*

Year	Number of Persons on Farms January 1	Percentage Change ^a
1910	32,076,960	...
1920	31,614,269	-1.5
1921	31,763,000	+ .5
1922	31,749,000	- .1
1923	31,130,000	-1.9
1924	30,817,000	-1.0
1925	30,830,000	+ ^b
1926	30,619,000	- .7
1927	30,170,000	-1.5
1928	30,188,000	+ .1
1929	30,220,000	+ .1
1930	30,169,000	- .2
1931	30,497,000	+1.1
1932	30,971,000	+1.6
1933	31,693,000	+2.3
1934	31,770,000	+ .2
1935	31,800,907	+ .1
1936	31,809,000	+ ^b
1937	31,729,000	- .3
1938	31,819,000	+ .3

* Releases of the Bureau of Agricultural Economics covering years 1920-1938, United States Department of Agriculture.

^a Computed.

^b Less than one-tenth of one per cent.

from other areas. The growing use of power machinery was a factor in farm population changes about which correspondents commented more frequently than ever before, especially in winter wheat area, the corn belt and some parts of the cotton belt.

Trends in Number of Agricultural Workers (Tables 17 to 21, Charts 1, 6, and 9)

Of the occupational groups reported by the census, Agriculture is second in numerical importance only to Manufacturing and Mechanical pursuits. In Tables 17 to 19 the number and percentage distribution of all agricultural workers for the census years from 1870 to 1930 is presented. In Table 20 the percentages that all agricultural workers are of the total population and of the total gainfully employed in the United States are displayed. Chart 1 shows the relationships between agricultural workers and the total gainfully employed since 1870. These data offer some important information required for an understanding of the trends in agriculture.⁴

The census figures on agriculture are subject to certain corrections due to improper counting. Thus, in 1870 there was

⁴ See footnote to Table 3, above.

an undercount of agricultural workers, principally in the Southern States, estimated at 423,000.⁵ The estimated undercount of the census of 1890 was 582,522.⁶ In 1910 it is estimated that approximately 930,000 unpaid family workers were counted as gainful workers in agriculture.⁷ The census was taken in January in 1920, thereby failing to secure the normal number of farm workers as compared with those of other census years which made the enumeration later in the year. The estimated undercount was 533,290.⁸ Unfortunately, while corrections can

TABLE 17

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS IN AGRICULTURE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Farmers, planters, and overseers	{ 2,981,320 50.4	{ 4,229,051 55.2	{ 5,281,557 62.5	{ 5,674,875 55.4	{ 5,952,318 48.0	{ 6,143,059 57.6	{ 5,671,693 54.2
Dairy farmers	{ 3,550 .1	{ 8,948 .1	{ 17,895 .2	{ 10,875 .1	{ 62,902 .5	{ 121,292 1.1	{ 165,877 1.6
Gardeners, florists, and nurserymen	{ 33,632 .6	{ 56,032 .7	{ 72,601 .9	{ 61,788 .6	{ 97,035 .8	{ 115,871 1.1	{ 126,300 1.2
Stock raisers	{ 15,359 .3	{ 44,075 .6	{ 70,729 .8	{ 84,988 .8	{ 56,125 .5	{ 82,453 .8	{ 96,463 .9
Other agricultural pursuits	{ 136 ...*	{ 1,061 ...*	{ 4,254 .1	{ 5,532 .1	{ 14,296 .1	{ 17,009 .2	{ 18,901 .2
Agricultural laborers ^b ..	{ 2,885,996 48.7	{ 3,323,876 43.4	{ 3,004,061 35.5	{ 4,410,877 43.0	{ 6,205,633 50.1	{ 4,186,123 39.2	{ 4,892,764 41.9
Total	{ 5,919,987 ^c 100.1	{ 7,663,043 100.0	{ 8,451,097 ^d 100.0	{ 10,248,935 100.0	{ 12,388,309 ^e 100.0	{ 10,665,812 ^f 100.0	{ 10,471,998 100.0

* Less than .1 per cent.

^b Includes unpaid family workers and hired hands.

^c Undercount; correction raises total to 6,344,987.

^d Undercount; correction raises total to 9,033,619.

^e Overcount; correction lowers total to 11,458,309.

^f Undercount; correction raises total to 11,199,102.

be made in the tables for the total of agricultural workers to accommodate these estimated overcounts and undercounts, details are lacking, so that the corrections cannot be made accurately for the two sexes or for the specific occupations within agriculture.

⁵ P. K. Whelpton, "Occupational Groups in the United States, 1820-1920," *American Statistical Association Journal*, XXI, 342, Table 4.

⁶ *Twelfth Census of the United States*, Special Reports, p. lxxvi.

⁷ According to J. S. Black and J. C. Folsom, "Research in Farm Labor," *Social Science Research Council, Bulletin No. 16*, p. 3, the overcount was "probably 1,000,000."

⁸ Edwin G. Nourse and associates, *America's Capacity to Produce*, 1934, pp. 496, 498-99.

TABLE 18

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS
IN AGRICULTURE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Farmers, planters, and overseers	{ 2,958,639 53.6	4,172,049 59.0	5,055,130 65.0	5,367,169 57.9	5,684,748 53.7	5,878,682 61.3	5,425,446 56.7
Dairy farmers	{ 3,133 .1	8,238 .1	16,161 .2	9,983 .1	60,241 .6	117,506 1.2	160,512 1.7
Gardeners, florists, and nurserymen	{ 33,353 .6	54,493 .8	70,186 .9	58,928 .6	91,889 .9	109,606 1.1	119,592 1.3
Stock raisers	{ 15,284 .3	43,859 .6	70,047 .9	83,056 .9	54,440 .5	79,722 .8	92,829 1.0
Other agricultural pursuits	{ 136 ... ^a	1,043 ... ^a	4,122 .1	5,289 .1	10,941 .1	14,551 .2	17,247 .2
Agricultural laborers ^b ...	{ 2,512,664 45.5	2,788,976 39.5	2,556,957 32.9	3,747,668 40.4	4,679,926 44.2	3,382,899 35.3	3,746,433 39.2
Total	{ 5,523,299 100.1	7,068,658 100.0	7,772,603 100.0	9,272,093 100.0	10,581,685 100.0	9,582,666 99.9	9,562,059 100.1

^a Less than .1 per cent.^b Includes unpaid family workers and hired hands.

TABLE 19

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN AGRICULTURE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Farmers, planters, and overseers	{ 22,681 5.7	57,002 9.6	226,427 33.4	307,706 31.5	267,570 14.8	264,377 24.4	246,247 27.1
Dairy farmers	{ 417 .1	710 .1	1,734 .3	892 .1	2,661 .1	4,086 .4	5,365 .6
Gardeners, florists, and nurserymen	{ 279 .1	1,539 .3	2,415 .4	2,860 .3	5,646 .3	6,265 .6	6,708 .7
Stock raisers	{ 75 ... ^a	216 ... ^a	682 .1	1,932 .2	1,665 .1	2,731 .3	3,634 .4
Other agricultural pursuits	{ ^a	18 ... ^a	132 ... ^a	243 ... ^a	3,355 .2	2,458 .2	1,654 .2
Agricultural laborers ^b ...	{ 373,332 94.1	534,900 90.0	447,104 65.9	663,209 67.9	1,525,707 84.5	803,229 74.2	646,331 71.0
Total	{ 396,773 100.0	594,385 100.0	678,494 100.1	976,842 100.0	1,806,624 100.0	1,083,146 100.1	909,939 100.0

^a Less than .1 per cent.^b Includes unpaid family workers and hired hands.

TABLE 20

WORKERS IN AGRICULTURE: PERCENTAGES OF POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1890	1900	1910	1920	
Total population	15.353	15.278	13.495	13.486	13.470	10.090 8.529
All gainful workers,						
male and female.....	47.337	44.060	37.171	35.252	32.458	25.630 21.446
[Males of]						
All male gainful workers	51.766	47.940	41.297	39.034	35.165	28.982 25.112
[Females of]						
All female gainful						
workers	21.608	22.454	17.333	18.364	22.371	12.669 8.463

Agriculture engaged 47.3 per cent of the total working population in 1870 (49.1 per cent if corrections are made) and 21.4 per cent in 1930. The trend has been downward in successive decades since 1870. How long this trend will continue cannot be determined, but in view of conditions observable in this field it appears certain to go on for some time.

Table 21 shows the percentage gain or loss by decades, comparing the development in agriculture with that of the total of gainful workers in the nation.

TABLE 21

PERCENTAGE CHANGE IN NUMBER OF WORKERS ENGAGED IN AGRICULTURAL AND IN ALL GAINFUL OCCUPATIONS BY CENSUS PERIODS, 1870-1930

Year	Persons Engaged in Agriculture		All Gainful Workers	
	Census	Corrected figures ^a	Census	Corrected Figures ^a
1870 .....	.....	.....	.....	.....
1880	+29.4	+20.8	+39.1	+34.5
1890	+10.3	+17.9	+30.7	+34.1
1900	+21.3	+13.5	+27.9	+24.6
1910	+20.9	+11.8	+31.3	+28.1
1920	-13.9	- 6.9 or -2.2	+ 9.0	+11.7 or +13.1
1930	- 1.8	- 1.8 or -6.4	+17.3	+15.8
1930 over				
1870	+76.9	+65.0	+290.5	+277.5

^a Calculations based upon the corrected figures presented in our Table 3, above.

While there was no actual loss in the number of workers listed in agriculture until after the 1910 census, in comparison with the development of the total body of workers the decline has been continuous since 1870. This decline appears to be advancing at each census enumeration.

Except for the fluctuation concerning females in the 1910 statistics, trends of the sexes are rather similar in slope and character when decennial percentages of gainfully employed are considered.

While numerous other striking changes may be taking place within the collection of occupations grouped under Agriculture, the generalizations permitted by the census figures for the total agricultural working population, and for the two sexes as well, stand as follows: Proportionately fewer of the total population, as well as a smaller proportion of all gainful workers, have been used in agricultural production in the successive decades since 1870. While agriculture still engages a fifth of the employed population of the United States, its demand for workers has remained fairly constant since 1910, with a slight indication that in each successive decade somewhat fewer workers are being required to man and manage the farms of the nation.

Relation of Crops to Distribution of Agricultural Workers

Because the problems of agricultural occupations are so directly related to the type of agriculture followed, the location of the principal crops is given in Table 22.

TABLE 22
AGRICULTURAL WORKERS IN PRINCIPAL AGRICULTURAL CROPS,
BY STATES, 1930*

Crop and State	Percentage of U.S. Production, 1929	Number in State	Percentage of All Gainful Workers in State	Percentage of All Agricultural Workers in U.S.
<i>Corn</i>				
Iowa	18.3	330,881	36.2	3.2
Illinois	12.9	351,977	11.1	3.4
Nebraska	10.1	197,199	38.9	1.9
Indiana	5.4	249,884	20.0	2.4
Missouri	5.3	370,878	25.4	3.5
Total	52.0	.....	.....	14.4
<i>Cotton</i>				
Texas	26.0	841,547	38.1	8.0
Mississippi ..	12.9	557,067	67.7	4.0
Arkansas	9.6	384,381	61.3	3.2
Georgia	9.2	497,941	42.8	4.8
Total	57.7	.....	.....	20.0

* *Fifteenth Census of the United States, 1930, "Agriculture,"* IV, 715, 729, 732, 736, 784, 794, 815, 818.

OCCUPATIONAL TRENDS IN AGRICULTURE

TABLE 22 (Concluded)

Crop and State	Percentage of U.S. Production, 1929	Number in State	Percentage of All Gainful Workers in State	Percentage of All Agricultural Workers in U.S.
<i>Wheat</i>				
Kansas	18.5	229,390	33.0	2.2
North Dakota ..	11.9	134,393	64.1	1.2
Nebraska	6.7	197,199	38.9	1.9
Oklahoma	6.4	306,091	37.0	2.9
Texas	5.5	841,547	38.1	8.0
Washington ..	5.3	104,077	15.7	1.0
Montana	5.1	79,518	42.0	.7
Total	59.4	.....	....	17.9
<i>Hay</i>				
Wisconsin ...	7.3	289,989	25.7	2.8
Minnesota ...	6.5	303,589	30.6	2.9
Iowa	6.3	330,881	36.2	3.2
New York	6.0	267,373	4.8	2.6
Nebraska	5.4	197,199	38.9	1.9
California ...	4.8	332,024	13.3	3.2
Illinois	4.2	351,977	11.1	3.4
Missouri	4.2	370,878	25.4	3.5
Michigan	4.1	247,652	12.8	2.4
Ohio	4.1	311,646	11.9	3.0
Total	52.9	.....	....	28.9

Geographical Distribution of Agricultural Labor

Agricultural labor is not evenly spread over the geographic map of the United States, nor is the character of agricultural employment similar in all agricultural areas. These facts give rise to occupational problems acutely felt in particular places but often lost sight of in any discussion of national trends. The census grouping of agricultural workers by geographic divisions is portrayed in Table 23.

Wide range in the value of agricultural products and the man power used in their production is indicated by the table. In 1930 California led all states, with 7.2 per cent of the total value of crops and livestock; but her agricultural economy is of such a character that she employed only 3.2 per cent of the nation's agricultural workers in that production. The Southern States show an opposite condition; Georgia, for example, had 2 per cent of the value of all crops and livestock in 1930, but employed 4.7 per cent of all agricultural workers. The stable, diversified general farming states show a closer correspondence between the production of farms and the num-

TABLE 23
DISTRIBUTION OF AGRICULTURAL CROPS AND WORKERS BY STATES AND REGIONS, 1930*

States and Regions	Crops and Livestock		Totals					Agricultural Workers				
	Value of Crop and Livestock	Percent- age of Grand Total	Agricultural Workers	Percent- age of Grand Total	Owners and Tenants	Percent- age of Agricultural Workers	Wage Farm Laborers	Percent- age of Agricultural Workers	Unpaid Family Workers	Percent- age of Agricultural Workers	Other Workers	Percent- age of Agricultural Workers
Maine	\$ 98,956	.79	51,519	.49	31,163	60.49	16,776	32.56	3,005	5.83	575	1.12
Vermont	76,716	.61	38,141	.37	20,742	54.38	14,781	38.75	2,179	5.71	439	1.15
New Hampshire	39,428	.32	22,091	.21	12,019	54.41	8,941	40.47	674	3.05	457	2.07
Massachusetts	90,966	.73	56,015	.54	21,125	37.71	30,347	54.18	2,472	4.41	2,071	3.70
Rhode Island	11,899	.10	8,873	.08	3,001	33.82	5,292	59.64	314	3.54	266	3.00
Connecticut	74,448	.60	36,687	.35	14,759	40.23	19,453	53.04	1,381	3.76	1,069	2.97
New England	\$ 392,473	3.15	213,326	2.04	102,909	48.19	95,595	44.81	10,025	4.70	4,897	2.30
New York	\$ 532,015	4.18	267,979	2.56	148,144	55.28	103,893	38.77	11,997	4.48	3,945	1.47
New Jersey	117,284	.94	64,471	.61	25,649	39.78	34,820	53.23	2,720	4.22	1,782	2.76
Pennsylvania	442,356	3.55	251,445	2.40	145,765	58.00	84,264	33.50	18,004	7.16	3,380	1.34
Middle Atlantic	\$ 1,061,655	8.67	583,893	5.57	319,588	54.72	222,477	38.10	32,721	5.62	9,107	1.56
Illinois	\$ 645,897	5.18	352,524	3.36	208,435	59.13	113,234	32.12	27,345	7.76	3,510	1.00
Indiana	397,842	3.19	250,150	2.39	166,429	66.53	65,652	26.25	15,967	6.38	2,102	.84
Michigan	355,529	2.85	247,983	2.36	158,519	64.05	64,117	25.86	22,792	9.19	2,235	.90
Ohio	463,991	3.64	312,218	2.98	200,775	64.31	99,714	32.73	18,247	5.84	3,482	1.12
Wisconsin	551,248	4.42	290,134	2.77	177,287	61.11	78,420	27.05	32,417	11.17	2,010	.69
Northeast Central	\$ 2,404,490	19.28	1,452,989	13.86	911,745	62.75	411,137	28.30	116,768	8.04	13,339	.92

* *Fifteenth Census of the United States, 1930. "Unemployment," Vol. I. Crops and livestock values from United States Department of Agriculture, Agricultural Year Book, 1932, p. 889. For a detailed summary of the distribution of farm crops in the United States based upon the census of 1930 and of 1935, see A Graphic Summary of Farm Crops, United States Department of Agriculture Miscellaneous Publication, No. 267, March 1938.*

OCCUPATIONAL TRENDS IN AGRICULTURE

TABLE 23 (Concluded)

States and Regions	Crops and Livestock		Agricultural Workers						Subgroups			
	Value of Crop and Livestock	Percent- age of Grand Total	Totals			Unpaid Family Workers			Percent- age of Agricultural Workers	Other Workers	Percent- age of Agricultural Workers	Percent- age of Agricultural Workers
			Agricultural Workers	Percent- age of Grand Total	Owners and Tenants	Percent- age of Agricultural Workers	Wage Farm Laborers	Percent- age of Agricultural Workers				
Iowa	\$ 889,522	7.13	331,152	3.16	211,917	63.99	89,048	26.89	27,745	2,442	8.38	.74
Kansas	459,871	3.69	229,544	2.19	162,847	70.94	46,702	20.35	18,063	1,353	8.13	.58
Minnesota	551,129	4.42	303,822	2.90	183,645	60.44	77,236	25.42	41,004	1,987	13.50	.64
Missouri	441,597	3.54	371,251	3.54	246,561	66.43	82,435	22.20	32,660	2,575	10.68	.69
Nebraska	538,017	4.31	197,342	1.88	129,953	65.86	47,070	23.85	19,023	1,291	9.64	.65
North Dakota	214,684	1.72	134,451	1.23	78,653	58.50	33,888	23.92	15,955	955	11.87	.71
South Dakota	279,259	2.24	130,786	1.25	84,237	64.41	32,551	24.90	13,351	637	10.21	.49
Northwest Central..	\$ 3,373,679	27.05	1,698,348	16.20	1,097,833	64.54	413,040	24.37	175,401	11,169	10.33	.66
Delaware	\$ 23,001	.19	17,341	.17	9,141	52.71	6,693	38.60	1,295	212	7.47	1.22
Florida	142,125	1.14	133,648	1.27	52,962	39.63	62,288	46.61	15,833	2,565	11.85	1.92
Georgia	289,357	2.40	497,716	4.75	249,991	50.23	114,758	23.06	130,087	2,900	26.13	.58
Maryland	97,592	.78	84,226	.80	38,632	45.87	37,530	44.91	6,447	1,317	7.65	1.56
North Carolina	339,680	2.72	499,923	4.77	270,187	54.05	93,874	18.78	133,687	2,175	26.74	.44
South Carolina	176,231	1.41	344,641	3.29	182,224	44.17	82,296	23.86	106,668	1,583	31.51	.44
Virginia	201,251	1.61	270,836	2.58	150,450	55.55	81,938	30.25	35,888	2,560	13.25	.95
West Virginia	97,762	.78	118,162	1.13	69,724	59.01	29,886	25.29	17,838	714	15.10	.60
South Atlantic	\$ 1,376,503	11.03	1,966,493	18.76	993,311	50.51	509,553	25.91	449,623	13,976	22.86	.71
Alabama	\$ 222,046	1.78	492,818	4.70	253,182	51.37	80,021	16.24	150,688	1,527	32.08	.31
Kentucky	220,793	1.77	353,575	3.42	234,776	65.47	69,078	19.26	53,143	1,578	14.82	.44
Mississippi	197,506	1.58	557,402	5.32	306,885	55.06	55,071	9.88	193,357	2,089	34.69	.37
Tennessee	235,996	1.92	376,623	3.59	234,627	62.30	68,784	18.26	71,784	1,428	19.06	.38
Southeast Central..	\$ 579,331	7.05	1,785,418	17.03	1,029,470	57.66	272,954	15.29	476,372	6,692	26.63	.37

Arkansas	\$ 155,078	1.24	384,612	3.67	240,108	62.43	59,516	15.47	83,194	21.63	1,794	.47
Louisiana	145,192	1.16	297,239	2.84	159,260	53.58	72,057	24.24	63,414	21.33	2,505	.84
Oklahoma	251,202	2.02	306,140	2.92	159,456	65.16	64,852	21.13	40,821	13.17	1,431	.48
Texas	678,361	5.44	842,001	8.03	438,697	53.04	198,700	23.61	149,236	17.72	5,308	.63
Southwest Central..	\$ 1,229,833	9.86	1,829,992	17.46	1,037,551	59.43	385,185	21.69	336,165	18.37	11,091	.61
Arizona	\$ 61,666	.49	38,697	.37	14,497	37.46	20,502	52.08	2,492	6.44	1,206	3.12
Colorado	200,177	1.60	106,234	1.01	58,352	54.93	33,170	35.93	8,383	7.89	1,329	1.25
Idaho	133,182	1.07	66,561	.63	40,199	61.32	20,287	30.94	4,213	6.43	837	1.31
Montana	130,754	1.05	79,678	.76	47,490	59.60	25,416	31.90	5,726	7.19	1,046	1.31
Nevada	19,354	.16	8,948	.09	3,528	39.43	4,735	52.92	347	3.83	333	3.78
New Mexico	51,080	.41	58,971	.56	30,438	51.62	22,018	37.34	5,799	9.83	716	1.21
Utah	69,037	.55	41,283	.39	24,766	60.04	12,446	30.15	3,513	8.51	538	1.30
Wyoming	68,082	.55	30,827	.29	16,210	52.53	12,169	39.43	1,833	6.01	595	1.93
Mountain	\$ 733,332	5.33	430,199	4.10	235,500	54.74	155,743	36.20	32,331	7.52	6,925	1.54
California	\$ 649,682	5.20	334,241	3.19	126,339	37.82	183,678	56.44	6,712	2.01	12,452	3.73
Oregon	145,356	1.17	82,031	.78	49,917	60.85	26,650	32.49	4,174	5.09	1,290	1.57
Washington	205,674	1.65	104,294	1.00	63,336	60.73	34,313	32.90	4,920	4.72	1,725	1.65
Pacific	\$ 1,000,712	8.02	520,566	4.97	239,652	46.04	249,641	47.95	15,906	3.04	15,467	2.97
Grand total	\$12,472,013	99.99	10,451,224	....	6,017,460	....	2,728,255	....	1,645,212	....	92,293	....

ber of workers employed. Indiana, for example, had 3 per cent of the value of all products, and used 2.4 per cent of all agricultural workers.

Agricultural Production per Worker

While the number of agricultural workers has not kept pace with either the growth in population or the total of gainfully employed, a smaller number of workers has been able to raise and market crops and livestock greatly in excess of that which a larger corps of workers were able to do previously. In 1787 when the Constitution was signed, it took 19 farm workers to feed one city dweller; in 1937, a century and a half later, 19 farm workers could feed 56 of our nonfarm people plus 10 persons living abroad to whom agricultural products are exported.⁹ How rapid this increase in man-hour productivity has been can be seen in Table 24.

TABLE 24
MAN-HOUR PRODUCTION PER UNIT OF AGRICULTURAL COMMODITY,
1878-1928

Crop Production	Man-Hours of Labor		
	1878	1898	1928
Wheat (100 bushels).....	129	86	49
Corn (100 bushels).....	180	147	104
Cotton (500-pound bale)....	304	285	235

As the technological changes and their adoption are not uniform, the rate of increase in man-hour productivity is not identical for the several kinds of agricultural production. Likewise the man-hour productivity in the same crop is not equal the country over, owing to differences in soil fertility, transportation facilities, and methods of working the land.

Agricultural production per male worker was 13 per cent greater in 1909 than in 1899, and 44 per cent greater in 1929 than twenty years previously.¹⁰ The acceleration of agricultural production per worker from 1909 to 1929 is so noticeable that it is remarked by all observers. The percentage increase was 37. This increased productivity made it possible for 7.5 per cent fewer persons to produce an agricultural output which was 27 per cent greater in 1929 than in 1909.¹¹ From 1922 to

⁹ E. H. McCrory and R. F. Hendrickson, *Technological Trends and National Policy*, National Resources Committee, United States Government Printing Office, 1937, p. 99.

¹⁰ Edwin G. Nourse et al., *America's Capacity to Produce*, 1934, pp. 38, 547.

¹¹ *Trends in Employment in Agriculture, 1909-1936*, WPA National Research Project, Report No. A-8, November 1938, Preface.

1926, while the crop acreage under cultivation remained the same, crop production increased 27 per cent.¹²

Among the factors explaining the enormous increase in per-worker productivity, the farm tractor "has made by far the most important contribution to the mechanization of agriculture in recent years. The use of the successful all-purpose tractor was introduced in 1924 Annual domestic sales of farm tractors increased from 2,000 in 1909 to practically 185,000 in 1936. In 1930 there were over 900,000 tractors on farms, and it is estimated that by 1936 the number reached one and a quarter millions, approximately one for every fifth farm Second in importance to the tractor in reducing labor requirements in agriculture is the extensive use of automobiles and auto-trucks on farms."¹³

Farm Production

While the number of persons gainfully employed in agriculture increased by 4,552,011, or 77 per cent, from 1870 to 1930, acreage under cultivation and the production of crops increased in the manner indicated in Table 25. The number of farms increased 136 per cent, of cultivated acreage 118 per cent. Of four major crops whose combined production is two-thirds of all crop production in the United States, the increase is: corn 243 per cent, wheat 181 per cent, cotton 435 per cent, and hay 316 per cent.

These large increases in farms and crops have taken place gradually but show an uneven rate of growth. The number of farms increased over 50 per cent in 1880 as compared with 1870, only 14 per cent in 1890 over the previous census, 25 per cent in the next decade, and 11 per cent in the following decade; remained almost stationary in 1920 as compared with 1910; and in 1930 had actually decreased below the 1920 and 1910 number of farms. Such an uneven trend is entirely concealed by figures which compare only the numbers of farms in 1930 and 1870. Improved acreage in farms grew rapidly from 1870 to 1880 and from 1880 to 1890, while the number of farms increased more rapidly within the 1870-1880 and the

¹² E. H. McCrory and R. H. Hendrickson, *op. cit.*, p. 99. For further discussion of this topic, see *Trends in Employment in Agriculture, 1909-1936*, WPA National Research Project, Report No. A-8, November 1938, p. 82.

¹³ *Summary of Findings to Date*, WPA National Research Project, March 1938, pp. 81-84. See also *Changes in Farm Power and Equipment: Tractors, Trucks, and Automobiles*, WPA National Research Project, Report No. A-9, December 1938.

TABLE 25

COMPARISON OF NUMBER OF FARMS, IMPROVED ACREAGE, VALUE OF FARM PROPERTY, AND PRODUCTION OF CERTAIN SELECTED CROPS, 1870-1930

Decade	Number of Farms ^a	Percent- age Change ^b	Improved Acreage in Farms ^c	Percent- age Change ^c	Total Value Farm Property ^d (Million Dollars)	Production of Certain Selected Crops ^e			
						Corn (Million Bushels)	Wheat (Million Bushels)	Cotton (Million Pounds)	Hay (Million Tons)
1870.....			188,921,099		11,125 ^f	760.9	287.7	1,325.0	27.3
1880.....	4,008,907	+50.7	234,771,042	+50.7	12,182	1,755.0	459.5	2,607.0	35.2
1890.....	4,584,641	+13.9	357,616,722	+25.6	16,082	2,122.0	468.4	3,564.0	66.8
1900.....	5,737,372	+25.7	414,498,487	+15.9	20,441	2,666.0	658.5	4,717.0	71.1
1910.....	6,361,502	+10.9	473,451,750	+15.4		2,552.0	683.4	5,090.0	87.2
1920.....	6,448,343	+1.4	508,073,007	+5.1	77,924	2,346.0	945.4	5,459.0	90.4
1930.....		-2.5	413,235,890	-17.9		2,614.0	809.2	7,088.0	113.7
1930 over 1870.....		+136.4		+118.7		243.5	181.3	434.9	816.5

^a Number of farms: United States census reports; *Report to President's Farm Tenancy Committee by Washington State Planning Council*, January 1937, p. 10; also *Statistical Abstract of the United States*, 1935, p. 564. The Census of Agriculture counts among "farms" all pieces of land worked by sharecroppers. This practice is vigorously objected to by Professor Karl Brandt, of Stanford University, in "Fallacious Census Terminology and Its Consequences in Agriculture," *Social Research*, Vol. V, No. 1, February 1938, pp. 18-36. In the judgment of this writer, "Not much less than all the statistics related to land tenure and the number and acreage of farms are thrown into confusion and have to be revised." The article is highly deserving of study. The magnitude and complexity of the task of enumerating farms are so great that any reported figure is to be regarded as an approximation. See especially *Trends in Employment in Agriculture, 1909-36*, WPA National Research Project, Report No. A-8, November 1938, Appendix B.

^b Computed.

^c Improved acreage in farms: from different census reports on agriculture from 1870 to 1930.

^d Value in farms: from different census reports on agriculture from 1870 to 1930.

^e Production of certain selected crops: from G. F. Warren and F. A. Pearson, *Physical Volume of Production in the United States*, Cornell University, 1932, Table 6, p. 40. For later estimates, since 1910, see *Trends in Size and Production of the Aggregate Farm Enterprise, 1909-36*, WPA National Research Project, Report No. A-6, July 1938. For the situation in the country as indicated by the censuses of 1930 and 1935, see *A Graphic Summary of the Number, Size, and Type of Farm, and Value of Products*, United States Department of Agriculture Miscellaneous Publication No. 266, October 1937.

^f Depreciate one-fifth for comparable value.

1890-1900 decades. Both increases are the natural consequence of the westward movement which settled the prairie country. From 1910 to 1930, however, the acreage in cultivated land decreased. Although acreage under cultivation in 1930 was below that of 1900, total crop production was 25 per cent higher.¹⁴

Production of farms during the depression has not diminished seriously. The over-all percentage decrease in the physical volume of all farm products from 1929 to 1935 was not

¹⁴ G. F. Warren and F. A. Pearson, *The Physical Volume of Production in the United States*, Cornell University Press, 1932, pp. 6-7.

more than 7 per cent, but percentages vary markedly for different kinds of farm products.¹⁵ Production trends during the depression have been affected by the agricultural policies of the federal government, the future of which is uncertain at the present writing.

Sex of Agricultural Workers

That agricultural occupations are primarily men's work is shown by the percentage display below:

Census	Percentage	
	Males	Females
1870	93.3	6.7
1880	92.2	7.8
1890	92.0	8.0
1900	90.5	9.5
1910	85.4	14.6
1920	89.8	10.2
1930	91.3	8.7

There has been no marked change in the sex composition of workers in agriculture, the apparent unusual increase in females engaged in that line of work in 1910 being caused, as has already been explained, by an improper census enumeration. Disregarding 1910, the range of male workers is from 89.8 to 93.3, or less than 4 per cent, that of females from 6.7 to 10.2 per cent. There is no particular sequence shown in the trend except that there were proportionately fewer women in agriculture in 1870 and 1930 than in 1900.

The composition of the several component occupational groups within Agriculture is indicated in Table 26.

This table, when read horizontally, permits comparisons to be made between the sexes engaged in the several occupational groups and when read vertically shows a comparison of the sexes within these occupations. It should be borne in mind that percentage changes of even a few points in such large populations as are represented by agricultural pursuits indicate substantial shifts in the working population.

Gardeners, Florists, Nurserymen is an expanding group, as are also Dairy Farmers and Stock Raisers. Yet their total number of workers is very small in comparison with the major occupations within Agriculture.

¹⁵ C. A. Bliss, *Production in Depression and Recovery*, National Bureau of Economic Research, Bulletin 58, November 15, 1935, p. 5. See also *Trends in Size and Production of the Aggregate Farm Enterprise, 1909-36*, WPA National Research Project, Report No. A-6, July 1938, Section II. For a review of the situation in farming with allusion to future possibilities, by the Secretary of Agriculture, see Henry C. Wallace, "The Future of the American Farm," *The New Republic*, November 8, 1939.

TABLE 26

PERCENTAGE DISTRIBUTION OF THE PRINCIPAL OCCUPATIONAL GROUPS
WITHIN AGRICULTURE, BY SEX, 1870-1930

Census	Laborers	Dairy Farmers	Farmers, Planters, Overseers	Gardeners, Florists, Nurserymen	Stock Raisers	Other Agricultural Pursuits
1870.....	48.75	.06	50.36	.57		
Males	42.44	.05	50.98	.56		
Females.....	6.31	.01	49.38	.01		
1880.....	43.38	.12	55.18	.73		.01
Males	36.40	.11	54.44	.71		.01
Females.....	6.98	.01	.74	.02		
1890.....	35.55	.21	62.50			.05
Males	30.26	.19	59.82	.83		.05
Females.....	5.29	.02	2.68	.03		—
1900.....	43.04	.11	55.37	.60		.05
Males	36.57	.10	52.37	.57		.05
Females.....	6.47	.01	3.00	.03		—
1910.....	50.09	.51	48.05	.78		.12
Males	37.78	.49	45.89	.73		.09
Females.....	12.31	.02	2.16	.05		.03
1920.....	39.25	1.14	57.60	.08		.16
Males	31.72	1.10	55.12	1.03		.14
Females.....	7.53	.04	2.48	.05		.02
1930.....	41.95	1.58	54.16	.20		.18
Males	35.78	1.53	51.81	1.14		.16
Females.....	6.17	.05	2.35	.06		.02

* Less than .01 per cent.

From an analysis of the basic tables, it appears that the predominant types of agricultural occupations for both sexes are those of farm operators and laborers on farms. Together, these two occupational groups comprised in 1870 99.1 per cent of the males in agriculture and 99.8 per cent of the females; in 1930 they made up 95.9 per cent of the males in agriculture and 98.1 per cent of the females. No marked trend is noted for these combined occupational groups in the decades intervening between these two censuses.

There is a very considerable change evidenced within different agricultural occupations as regards female workers. For example, in 1870 and 1880 less than 10 per cent of the women in agriculture were reported as Farmers, Planters, and Overseers. This had increased to 27 per cent in 1930. The increase is both relative and absolute. On the other hand,

the percentage of all females in agriculture who were farm laborers fell from a high of 94 in 1870 to a low of 66 in 1890 and was 71 in 1930.

Vertical Distribution of Agricultural Workers

"Farmers" is a collective term under which are gathered a wide range of occupations displaying different social-economic circumstances. Judged by any criteria, "farmers" even in the same locality are not identical. When the factor of geographic location is added, say in an attempt to describe the New England general farmer, the North Dakota wheat farmer, the cotton farmer and sharecropper of the old and new South, the citrus grower of Florida and of southern California, and the cattle raiser of Montana, the term "farmer" ceases to have a definite meaning. Yet it is essential for the study of trends in agricultural workers to determine what is happening to these "farmers." Table 27, while not sufficiently detailed, may prove helpful.

In 1935 less than half (46 per cent) of all agricultural work-

TABLE 27

VERTICAL DISTRIBUTION OF AGRICULTURAL WORKERS, 1925-1935*

Type of Worker	1925 Number	1935		Percentage Change 1935 over 1925
		Number	Percentage	
Total farm owners	3,868,332	3,899,000	46.0	+ .8
Full owners of farms	3,313,490	3,210,000	37.9	-3.2
Part owners	554,842	689,000	8.1	+24.2
Tenants	2,462,608	2,865,155	33.9	+16.3
Cash tenants	1,839,550	2,148,899	25.4	+16.8
Sharecroppers	623,058	716,256	8.5	+15.0
Managers of farms	40,700	48,104	.6	+18.2
Hired help (permanent hands)		1,645,602	19.5	
Total except hired help.	6,371,640	6,812,259		
Total		8,457,861	100.0	

* *Census of Agriculture, 1935, III, 167; Census of Agriculture, 1925, Part I, p. 3. Census of Agriculture, 1925 and 1935, relate to January 1 of those years and to persons working on farms as of the first week in January and the crop years 1924 and 1934. For a detailed summary of this topic, see H. A. Turner, A Graphic Summary of Farm Tenure, United States Department of Agriculture, Miscellaneous Publication No. 261, 1936. Legal ownership without regard to the equities held has a limited significance. Of every 1,000 farms operated by their owners in 1935, 415 were mortgaged. Of every 1,000 operated by tenants and managers, the number mortgaged is estimated at 251. For additional related information, see N. J. Wall and E. J. Engquist, A Graphic Summary of Agricultural Credit, United States Department of Agriculture, Miscellaneous Publication No. 268, September, 1938.*

* No data available.

ers were farm owners, and only 38 per cent of all agriculturists were described by the Census of Agriculture as "full owners." These are the people ordinarily thought of as "farmers" when that term is used in general conversation. They are approximately 6.5 per cent of the national labor force. They are not increasing in number, independently owned farms having declined 3.2 per cent from 1925 to 1935.

The number of "part owners" of farms engaged in agriculture in 1935 was 689,000, or 8 per cent of all agricultural workers. This status is increasing among agriculturists, the gain in "part owners" from 1925 to 1935 being 24.5 per cent. Thus, while the class of "farm owners" has about maintained its numerical importance in the ten-year period under scrutiny, it has done so at the expense of full-owning farmers, and only because of the increase in part owners. This is not a deplorable condition if it represents the success of a new generation of farmers in acquiring a stake in their farms. But, judging by the increasing period of tenancy required before a farm can be fully owned, the evidence in this table of the growth in farm tenants, the increase in size of individual farms, the rapid mechanization of farm operations, the greatly increased cost of providing the tools and equipment for farm use, the relatively high farm interest rates and capital charges, and the continuance of relatively low crop prices and farm income, it appears safe to say that full owners of farms are giving way to part owners and tenants. It is not certain, but such data suggest that the status of "part owner" is becoming permanent for an increasing number of farmers.

Tenants were 34 per cent of all agricultural workers in 1935. A fourth of all tenants were sharecroppers; three-fourths work farms on a cash basis. The number of tenant farmers is increasing rapidly, the gain from 1925 to 1935 being 16 per cent. Cash tenants and sharecroppers increased at about the same rate as the total group. Judging by such studies as Dr. Paul Taylor's "Power Farming and Labor Displacement in the Cotton Belt, 1937," these sharecroppers are facing degradation to the level of hired help or casual farm laborers owing to the introduction and widespread use of power-driven machinery.¹⁶

¹⁶ Paul Taylor, "Power Farming and Labor Displacement in the Cotton Belt, 1937," *Monthly Labor Review*, March 1938, p. 595, and April 1938, p. 85, United States Department of Labor, Bureau of Labor Statistics. See also *Cotton Growing in Texas*, NYA of Texas, J. C. Kellum, State Administrator, April 1939.

Farm managers are a relatively small part of all agricultural workers, being less than one per cent of that labor force in 1935. There has long been a disposition on the part of absentee farm owners to rent their farms on either a cash or a share basis because they feel that greater diligence will be shown by one who shares in the yield of the farm than by a manager who has no such incentive for work. However, many farms tilled by tenants have not been of suitable size, location, or crops to permit large-scale agricultural operations under resident managers. With bank foreclosures of farms greatly increased during the recent depression, and mechanization developed to the point where power equipment can be operated efficiently with hired help, large-scale farming is increasing. The number of managers of such farms is also growing. From 1925 to 1935 the gain was 18 per cent.

There were 2,732,972 paid farm laborers in April 1930, according to the census enumeration.¹⁷ This was 5.6 per cent of the national labor force in that year. An estimate based on data from the Bureau of Agricultural Economics¹⁸ indicates for the same year 2,850,000 "hired workers," or 5.8 per cent of the national labor force. This is again an annual average derived from figures on the first of each month.

Hired help actually employed on farms totaled 1,645,602 in March 1935, when the Census of Agriculture was taken. An estimate based on data from the Bureau of Agricultural Economics of the United States Department of Agriculture reports 2,468,000 for the same year.¹⁹ The latter figure is an annual average derived from figures for the first of each month. These figures may be regarded as a general indication of the employed farm labor population in 1935.

Farmers,²⁰ Planters, Overseers (Tables 28 and 29, Chart 9)

Agricultural operators in the United States are still characterized as "farmers." As was the case in 1870 throughout the successive decades, somewhat more than 50 per cent of all agricultural workers were crop-farm operators. An increase in the actual number of these operators took place from 1870

¹⁷ *A Social-Economic Grouping of the Gainful Workers of the United States*, Bureau of the Census, Washington, 1938.

¹⁸ Reported in *Trends in Employment of Agriculture*, WPA National Research Project, Report No. A-8, November 1938, p. 11.

¹⁹ *Ibid.*

²⁰ Includes sharecroppers. For objections to this inclusion, see footnote to Table 25, above.

to 1890, the number ranging between five and a quarter to five and three-quarters millions in the decades since that time. In fact, between 1920 and 1930 there seems to have been a downward trend in actual number of persons, which may have permanent significance in view of the modern conditions prevailing in agriculture.

TABLE 28

FARMERS, PLANTERS, AND OVERSEERS:* PERCENTAGES OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	7.732	8.432	8.434	7.467	6.472	5.811	4.620
All gainful workers, male and female.....	23.839	24.316	23.230	19.519	15.595	14.762	11.615
[Males of] All male gainful workers	27.730	28.295	26.859	22.595	18.891	17.779	14.248
[Females of] All female gainful workers	1.235	2.153	5.784	5.785	3.313	3.092	2.290

* Includes farmers, general farms; fruit growers; farm foremen; orchard nursery; etc., for 1930, 1920, 1910, for which years numbers for these subgroups are reported by the censuses.

While the total of gainfully employed increased 290 per cent from 1870 to 1930 and the total increase in persons employed in agriculture was 77 per cent, that of farm operators was 90 per cent (Table 21, above). Whereas from 1870 to 1930 the number of males employed in agriculture increased 73 per cent, the number of male farm operators increased 83 per cent. And while the increase in all female gainful workers during the sixty years was 485 per cent and of females in agriculture 129, female farm operators increased 985 per cent.

Various factors such as general conditions of labor in cities, market prices, improved technology, variations in climate, rainfall, and soil conditions, governmental and private policy respecting capital and crop loans influence the number of farm operators. The data available on these matters are too meager to permit accurate calculation of their effects. However, certain trends are discernible.

The characteristic way in which farmers have secured holdings of their own in the past has been through farm tenancy.²¹

²¹ W. S. Spillman, "The Agricultural Ladder," *American Economic Review*, I (Supplement), 170-79.

It still remains one of the principal methods of doing so. But rural sociologists have determined that it offers much smaller possibility than formerly, a larger number of farm tenants remaining in that status throughout their productive lives.

The increase in farm tenancy is indicated in the following figures:

TABLE 29

PERCENTAGE OF FARM OWNERSHIP, MANAGERSHIP, AND
TENANCY IN THE UNITED STATES, 1880-1935*

Year	Owners	Managers	Tenants ^a
1880	74.4 ^b	...	25.6
1890	71.6 ^b	...	28.4
1900	63.7	1.0	35.3
1910	62.1	0.9	37.0
1920	60.9	1.1	38.1
1930	56.7	0.9	42.4
1935	57.2	0.7	42.1

* Compiled from *Statistical Abstract of the United States, 1936*, p. 1579.

^a Includes sharecroppers. See footnote to Table 25, above.

^b Owners and managers reported together.

In the fifty-five years under review, of all cultivated farms the number of tenant-operated farms increased from 25 per cent to 42. The over-all percentage increase of tenants for the period was 180, while that of all other operators was only 32. In every decade between 1900 and 1930 tenant farms increased in greater number than nontenant. This does not tell the whole story, however, for many farmers possess the title of "owner" without having an equity of any substantial size. In fact, the proportion of the value of all farms held by landlords or mortgage companies increased from 41 per cent in 1890 to 58 per cent in 1930.²²

Between 1930 and 1935 the total number of farms again increased by slightly more than one half million. A large percentage of the new farms were small, subsistence or part-time farming units established by persons unable to find employment in other occupations. . . . In both the north and the west, the number of tenants increased at a much more rapid rate than the total number of farmers. In most of the North Central states the percentage of tenancy reached new high levels in 1935. In the South, however, the trend was different. There, the percentage of farmers who were tenants decreased from 55.5 per cent in 1930 to 53.5 in 1935, with an actual decrease in the number of colored tenants, many of whom apparently reverted to the status of farm laborers. . . .²³

²² John D. Black and R. H. Allen, "Growth of Farm Tenancy in the United States," *Quarterly Journal of Economics*, May 1937, p. 395 (map).

²³ *Farm Tenancy*, Report of the President's National Resources Committee, February 1937.

The factors affecting the growth of tenancy in the United States are numerous. Among them are: the unlimited use of fee-simple ownership of land; the absorption of a very extensive part of the public lands by individuals and corporations not interested in direct farm operation; speculation in land values leading to excessive prices; a surfeit of free, dependent, Negro labor following the Civil War; unfavorable credit conditions; the exhaustion of land; and recurring economic depressions, particularly since the World War. Relatively low incomes have fostered undernourishment and disease, illiteracy and limited education, and generally lower standards of living among tenants. A large fraction of tenants exist on a scale of living below any level of decency.

These discouraging facts are not to be read as implying that the position of tenant is universally bad. Many tenants are as prosperous as many owners, and tenancy as a probationary step leading to farm ownership may still be recommended. They do, however, indicate that all persons considering tenancy in these times, especially relatively resourceless rural youths, should have as complete an understanding as possible of the particular conditions confronting them.

Dairy Farmers

Dairy farmers made up only a fraction of one per cent of the total gainfully employed in agriculture in 1870; and, while they increased in number from 3,550 in that census to 165,877 in 1930, they still remain a small fractional part of all agricultural workers. However, while the total gainfully employed increased 290 per cent since 1870, the total engaged in dairy ownership increased 4,572 per cent.

Owning and operating a dairy requires skill, training, and capital. What the future will bring cannot be determined from existing data, but the census trends indicate that the number of dairy farmers has been increasing steadily, with a sharp rise to be noted beginning in 1910. At most the inclusion of Dairy Foremen in the group in the last three decades has added not over 2 per cent to the total of each census, so that the figures actually reveal a substantial increase in the number of dairymen.

Dairy farm operations have been subject to technological changes and scientific improvements, particularly during the past twenty years. While there were only 15 per cent more

dairy cows in the United States in 1930 than in 1920, production of milk was 35 to 40 per cent greater.²⁴ Much yet remains to be done in culling dairy herds, installing better farming and feeding practices, and securing a steady market flow at profitable prices before the full measure of productivity will be reached. The future depends so largely on these factors, and upon the growth and movement of population and the food habits of the people, that a safe prediction concerning the trend in the number of dairy farmers cannot be made.

The occupation of dairy farmer is still almost exclusively confined to males. Of the 165,877 dairy farmers reported in 1930, only 5,365 were females. The trend indicates, however, that both sexes engaged in dairy farming are growing in numbers.

Gardeners, Florists, Nurserymen

These occupations constitute a relatively small group of the agricultural workers but one which has expanded during the successive decades of the census since 1870. From 33,632 persons engaged in these occupations in 1870, the number grew to 126,300 in 1930, an increase of 275 per cent in the sixty years. Thus, when compared with the trend of gainfully employed in Agriculture, Gardeners, Florists, and Nurserymen have increased more rapidly. Undoubtedly, this expansion is due to the growth of horticulture, the increase in home gardens of city dwellers, fine suburban residences, and the wider use of decorative flowers and plants.

Data are too few to disclose the future development of these factors, but it is unlikely that there will be any sharp reversal of the trend so far indicated. Instead there are indications, such as growth in the city population and the rise in its standard of living, that these occupations should experience further expansion.

Even so, this occupational group is only a small fraction of the gainfully employed, and relative to the total in the working population is making no unusual advance. Males and females show similar trends in this group.

Stock Raisers

Stock Raisers constitute another of the minor occupational groups, in point of number, classed under agricultural pur-

²⁴ O. E. Baker, "Natural Wealth," *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933.

suits. The raising of stock is an expanding occupation, having increased from 15,359 workers in 1870 to 96,463 in 1930. Yet in comparison with the trend of the total of gainfully employed, the group has remained about stationary since 1900, in which respect it resembles the trend of the agricultural workers as a whole. Within the category of agricultural workers, however, the number has advanced from .3 per cent of that body in 1870 to .9 per cent in 1930. Most stock raisers are males, although the 1930 census reported 3,634 females engaged in this occupation as stock raisers, an increase of 33 per cent over the figure of the previous census.

With range land suitable for grazing purposes already fenced and being utilized, openings in virgin territory for new stock raisers are almost nonexistent. But changes are taking place in agricultural economy which frequently make it more profitable for general farmers to engage in stock raising than in general farm operations, and newer methods of feeding are making possible small stock-raising enterprises. These facts seem to account for the increasing number of stock raisers.

The introduction of the farm tractor and the automobile has released a large acreage formerly required for feeding work horses and mules which is now available for crops and stock raising. That the average American diet is not yet sufficiently supplied with milk and meat and the average American family is not yet well enough clothed and shod are matters of common observation. There would seem to be good reason to expect an increase in the number of persons engaged in stock raising.

Other Agricultural Pursuits

This group includes apiarists, poultry raisers, and unusual types of enterprise which make use of the soil. It is a small but expanding category, having advanced from 136 persons in 1870 to 18,901 in 1930. Even so, it still remains only a fractional part of the total gainfully employed in agriculture. Again, it is observed that this group is made up primarily of males and that the trend of increase is approximately the same for both males and females.

Agricultural Laborers²⁵ (Tables 30-32, Chart 9)

In Table 30 the trends are given for persons available for work at agricultural labor. These include: general farm la-

²⁵ Exclusive of sharecroppers. See footnote to Table 25, above.

borers; harvest hands; dairy-farm laborers; stockherders and feeders; garden, greenhouse, nursery and orchard laborers; hay balers and grain threshers; poultry-farm laborers; irrigators and ditch tenders. In short, this classification is made up of those who work at farming and harvesting operations under supervision.

TABLE 30

AGRICULTURAL LABORERS;* PERCENTAGES OF TOTAL POPULATION, AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	7.485	6.627	4.797	5.804	6.747	3.960	8.578
All gainful workers, male and female.....	23.077	19.111	13.213	15.172	16.259	10.059	8.996
[Males of] All male gainful workers	23.550	18.915	13.586	15.777	15.552	10.231	9.839
[Females of] All female gainful workers	20.331	20.207	11.422	12.468	18.892	9.395	6.011

* Includes: farm laborers (unpaid family); farm laborers (home farms); dairy-farm laborers; farm laborers (working out); stockherders, drovers, feeders; cranberry-bog laborers; garden laborers; greenhouse laborers; orchard and nursery laborers; corn shellers, hay balers, grain threshers; ditchers (farm); irrigators and ditch tenders; poultry-yard laborers. Numbers for these subgroups are reported in the censuses of 1910 and 1920.

Some caution must be exercised in reading the census figures presented in Table 30. Besides the effects of differing seasons when the several censuses were taken, there are also errors present in recording due to the overzealousness of certain enumerators. This is especially true of 1910, because the instructions given probably resulted in recording among the gainfully employed as farm laborers those children and women who were members of farm households but not full-time paid workers. This improper enumeration probably affects the number of both males and females.

In relation to the trend of the total gainfully employed, the trend of both males and females engaged as agricultural laborers has been downward since 1870. Agricultural laborers made up 23 per cent of the total working population in 1870, but declined to 9 per cent by 1930. The decline was only relative, however, for in terms of actual numbers engaged in farm labor 52 per cent more persons were employed in 1930 than in 1870. This does not tell the whole trend story, either, for the

increase in actual numbers of farm workers continued until about 1910, which would correspond roughly to the period when free land was available for development in appreciable quantities, but has not advanced since then. During the decades ending in 1920 and 1930, while agricultural productivity has advanced enormously and technological changes have occurred with great rapidity, the actual number of workers available for farm labor has not increased.

In terms of actual numbers of employed "hired workers" and "family workers," the Bureau of Agricultural Economics of the United States Department of Agriculture supplies indexes for the years 1928-1936, as shown in Table 31.

TABLE 31
INDEX NUMBERS OF "FAMILY WORKERS" AND "HIRED WORKERS"
IN AGRICULTURE FOR SPECIFIED YEARS (1924-1929 = 100)*

Year	"Hired Workers"	"Family Workers"
1928	100	99
1929	101	99
1930	97	99
1931	91	101
1932	85	102
1933	83	102
1934	80	101
1935	84	103
1936	85	101

* "Family workers" includes operator and other unpaid members of the family. From *Trends in Employment in Agriculture, 1909-36*, WPA National Research Project, Report No. A-8, 1938, p. 27.

It will be observed that whereas "family workers" made a slight increase in this period, there has been a notable decline in the number of "hired workers."

It may be suggested, in view of these facts, that agriculture has little place for an increased number of farm hands. But despite changes in agricultural production and marketing, replacements of farm workers may be needed to maintain a supply of from two and a half to three million persons as harvest, field, and barn workers. If the mechanical corn harvester, which is already a reality, becomes widely used, and the mechanical cotton picker is perfected, drastic changes will occur in the need for agricultural labor. How great these changes will be can be estimated from the facts that corn and cotton are about 40 per cent of the total average acreage

planted in crops and employ about half the paid labor used in agricultural harvesting.²⁶

Such observations strongly suggest that we have passed the peak need for agricultural laborers and that the present labor force is maintained largely because of the backwardness of farmers in buying and using labor-saving equipment and because the banking structure provides inadequately for the capitalization of our farm enterprises. As a consequence of these unfavorable conditions, farming is often maintained on the basis of subsistence rather than as a commercial enterprise for profit.

While these observations may correctly describe the general conditions of farm labor, it must ever be kept in mind that alterations in certain crops, new acreage under cultivation, or important shifts in the market may change the demands for farm labor in certain parts of the country. But if the trends previously described continue to hold, these changes will not improve conditions for agricultural labor at large. Such labor faces an apparent inevitable decline, both in comparison with the total of gainfully employed and in terms of actual number of workers—a decline which may be very abruptly precipitated by further technological change.

In Table 30, above, data are given concerning the trends of males and females engaged in agricultural labor. The trend for males follows the trend for all agricultural laborers. But the trend for females is somewhat different. In 1870 and 1880 approximately 20 per cent of all gainfully employed women worked on farms. This percentage dropped to 11 in 1890, climbed slightly in the next decade, and, excluding the 1910 census for reasons already given, has declined in successive decades since then. This trend reflects the movement of female workers away from agriculture and into occupations in the clerical, professional, manufacturing, and personal and domestic service fields.

As a matter of fact the number of males and females engaged in agricultural labor is considerably higher now than in 1870. But during the sixty-year span under review gainfully employed males engaged in all occupations increased 257 per cent, while males engaged in agricultural labor increased only 49 per cent. The total number of working females

²⁶ O. E. Baker, "Natural Wealth," *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 102.

increased 485 per cent since 1870, whereas females working as agricultural laborers increased only 73 per cent.

The census data do not permit complete detailed studies of the several subgroups which make up agricultural laborers. Such details can be given for 1910 and 1920 only, and even then comparisons between these two sets of figures must be made with caution because of already indicated inaccuracies in the 1910 census, which resulted in an overenumeration in certain categories. Nevertheless, because information on specific occupations is of value to guidance counselors and social scientists, even these partially complete figures are added in Table 32.

TABLE 32
DETAILED STUDY OF AGRICULTURAL LABORERS, 1910-1920*

Group	Males and Females		Percentage	
	1910	1920	1920 Change	
Farm laborers working out.	2,636,966	2,055,276	-22.0	
Family workers	3,310,534	1,850,119	-44.2	(-22.4)*
Dairy-farm laborers	35,014	63,367	+80.9	
Stock herders, drivers, feed- ers	59,250	56,766	- 4.2	
Garden laborers	81,314	81,532	+ 0.3	
Greenhouse laborers	17,757	16,239	- 8.5	
Orchard and nursery laborers	33,472	38,998	+16.5	
Corn shellers, hay balers, grain threshers	5,617	9,646	+71.7	
Ditchers	15,198	5,379	-64.6	
Irrigation-ditch tenders	2,883	2,600	- 9.8	
Poultry-yard laborers	3,233	4,599	+42.2	
Cranberry-bog laborers	1,384	241	-82.6	
Others	3,011	1,366	-54.6	
Total	6,205,633	4,186,128	-32.5	(-20.7)*

* Exclusive of sharecroppers. See footnote to Table 25, above.

* Statistical corrections of the census. See above, p. 13.

A correction must be made in family workers because of the overenumeration in 1910. Thus, instead of 3,310,534 such workers, there were 2,385,421. The decrease in 1920 over 1910 is, therefore, 22.4 per cent rather than the recorded 44.2 per cent, and the decline in total agricultural laborers is 20.7 per cent rather than the reported 32.5 per cent.

Because of the large populations involved, what occurs among farm hands greatly influences the whole trend of farm labor. Their number has declined sharply in the decades of this century, largely owing to the cityward movement and the rise of industrial labor, the increased man-hour productivity of

farm workers because of better farm management and technological changes, and the relative inelasticity in the consumption of farm products—all of which tend to reduce the number of farm workers whom farm operators require or can afford to hire.

Dairy-farm, orchard and nursery laborers, and garden and poultry-yard laborers are increasing in numbers, showing a trend opposite to that of the total group engaged in agricultural labor. In these several aspects of agricultural production there has been a noticeable expansion. The population has grown and the standards of living and habits of the consuming public have undergone changes, causing increased use of milk, eggs, butter, vegetables, fruits, and cut and garden flowers. While technology has advanced in these areas of performance, it has not been able to curtail the need for more labor required to produce an ever increasing output. Even in the production of garden crops the number of laborers has been maintained, although technological changes such as mechanical cultivators and harvesters have greatly increased production.²⁷

²⁷ Publications of the WPA National Research Project relating to changes in technology and labor requirements in particular crops are: *Cotton*, Report No. A-7, September 1938; *Corn*, Report No. A-5, June 1938; *Potatoes*, Report No. A-4, March 1938; *Sugar Beets*, Report No. A-1, August 1937. These publications also include a bibliography with the title, *Selected References in Practices and Use of Labor on Farms*, 2 parts, Report No. A-3, October 1937.

CHAPTER III

FORESTRY AND FISHING

The 1930 census combines data concerning forestry and fishing. The only apparent reason for doing so is that both are related to the development and use of natural resources. There is little if any other affinity between the groups of occupations represented.

Occupations listed in this chapter under Forestry and Fishing have been collected from other categories, with adjustments to make the groupings conform to the census classification for 1930. Lumbermen, Raftsmen, and Woodchoppers was recorded under Agriculture until the 1930 census. Fishermen and Oystermen was taken from the Manufacturing and Mechanical groups and recorded under Agriculture in 1910. In 1930 these two groups were combined to make up Forestry and Fishing.

Tables 33 and 34 present the number in Forestry and Fishing combined. In 1930 these workers totaled 250,469 persons, or .5 per cent of all gainful workers. The Forestry and Fishing group increased in numbers until 1920 and then declined sharply. However, their proportion of all gainful workers in 1930 fell to about what it had been as far back as 1880.

Males in Forestry and Fishing, while increasing in number, have likewise declined in their proportion to the total labor force reported in successive census records. Females engaged in these pursuits are a negligible number, and constitute only a minute fraction of all female gainful workers. The type of work performed in these industries is distinctly masculine and affords little opportunity for female workers.

Most workers in Forestry and Fishing—94 per cent in 1930—were lumbermen, raftsmen, and woodchoppers, fishermen and oystermen. In the combined census category of Forestry and Fishing, forestry workers made up 70 per cent, fisherman and oystermen 30 per cent.

In comparison with the growth of the total of gainful workers, forestry and fishing occupations developed as shown in Table 35.

In the successive census records the percentage increase in the number of workers in both Forestry and Fishing exceeds

TABLE 33

NUMBER AND PERCENTAGE DISTRIBUTION OF GAINFUL WORKERS IN
FORESTRY AND FISHING, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
MALE AND FEMALE							
Foresters, Forest Rangers, Timber Cruisers .....	{ ....	....	....	....	4,332	3,653	8,057
	{ ....	....	....	....	1.8	1.3	3.2
Lumbermen, Raftsmen, Woodchoppers	{ 26,090	43,382	99,593	108,095	161,268	205,315	162,233
	{ 49.0	51.2	62.4	61.1	66.7	76.0	64.8
Owners and Managers of Log and Timber Camps	{ ....	....	....	....	7,931	8,410	6,899
	{ ....	....	....	....	3.3	3.1	2.8
Fishermen and Oystermen..	{ 27,106	41,352	60,162	66,940	68,275	52,896	73,290
	{ 51.0	48.8	37.7	38.9	28.2	19.5	29.2
Total	{ 53,196	84,734	159,725	177,035	241,806	270,214	250,469
	{ 100.0	100.0	100.1	100.0	100.0	99.9	100.0
MALE							
Foresters, Forest Rangers, Timber Cruisers .....	{ ....	....	....	....	4,332	3,651	8,042
	{ ....	....	....	....	1.8	1.4	3.2
Lumbermen, Raftsmen, Woodchoppers	{ 26,090	43,382	99,593	107,832	161,191	205,086	162,188
	{ 49.1	51.2	62.4	61.2	66.8	76.1	64.8
Owners and Managers of Log and Timber Camps	{ ....	....	....	....	7,927	8,397	6,889
	{ ....	....	....	....	3.3	3.1	2.8
Fishermen and Oystermen..	{ 27,071	41,287	59,899	66,478	67,799	52,457	73,071
	{ 50.9	48.8	37.6	38.8	28.1	19.5	29.2
Total	{ 53,161	84,669	159,402	176,360	241,249	269,541	250,140
	{ 100.0	100.0	100.0	100.0	100.0	100.1	100.0
FEMALE							
Foresters, Forest Rangers, Timber Cruisers .....	{ ....	....	....	....	....	2	15
	{ ....	....	....	....	....	.3	4.6
Lumbermen, Raftsmen, Woodchoppers .....	{ ....	....	60	213	77	279	95
	{ ....	....	18.6	31.6	13.8	41.5	28.9
Owners and Managers of Log and Timber Camps	{ ....	....	....	....	4	13	10
	{ ....	....	....	....	.7	1.9	3.0
Fishermen and Oystermen..	{ 35	65	263	462	476	379	209
	{ 100.0	100.0	31.4	68.4	85.5	56.3	63.5
Total	{ 35	65	323	675	557	673	329
	{ 100.0	100.0	100.0	100.0	100.0	100.0	100.0

the gains made by the total of gainful workers, except for forestry workers in 1900 and 1930, for fishermen in 1900, 1910, and 1920.

FORESTRY AND FISHING

TABLE 34

WORKERS IN FORESTRY AND FISHING: PERCENTAGE OF TOTAL POPULATION
AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population.....	.138	.169	.255	.233	.263	.256	.204
All gainful workers, male and female.....	.425	.487	.703	.609	.634	.649	.513
[Males of]							
All male gainful workers .....	.498	.574	.847	.742	.802	.815	.657
[Females of]							
All female gainful workers .....	.002	.002	.008	.013	.007	.008	.003

TABLE 35

DECENNIAL PERCENTAGE CHANGES IN NUMBERS OF PERSONS ENGAGED IN
FORESTRY AND FISHING COMPARED WITH THAT OF THE TOTAL POPULA-
TION AND OF THE TOTAL GAINFULLY EMPLOYED, 1870-1930

Year	Total Population Percentage Change	Total Gainfully Employed Percentage Change	Forestry Percentage Change	Fishing Percentage Change
1870 .....	.....	.....	.....	.....
1880	+ 30.1	+ 39.1	+ 66.3	+ 52.6
1890	+ 24.8	+ 30.7	+129.5	+ 45.5
1900	+ 21.4	+ 27.9	+ 8.6	+ 14.6
1910	+ 21.0	+ 31.3	+ 60.5	- 1.0
1920	+ 14.9	+ 9.0	+ 25.3	- 22.6
1930	+ 16.1	+ 17.3	- 18.5	+ 38.7
1930 over 1870	+218.4	+290.5	+479.2	+107.2

FORESTRY

General Characteristics (Tables 36-38, Charts 6 and 9)

Details for all of the subgroups within forestry occupations are not available before the 1910 census. Prior to that census only a group total can be given. Lumbermen, Raftsmen, and Woodchoppers has been the predominant subgroup, constituting over 90 per cent of all forestry workers in 1910, 1920, and 1930. Their relative numerical importance within this group of workers has not altered greatly in successive decades. However, the number of foresters, forest rangers, and timber cruisers has increased slightly, from 2.5 per cent of all forest

workers to 4.5, while the number of owners and managers of logging and timber camps has declined somewhat, from 4.6 to 3.9 per cent.

These shifts reflect the role of the government in its extended control and conservation of forest lands, necessitating a much larger force of forestry workers. The concentration of

TABLE 36
NUMBER AND PERCENTAGE DISTRIBUTION OF GAINFUL WORKERS IN
FORESTRY, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
MALE AND FEMALE							
Foresters, Forest Rangers, and Timber Cruisers ....	{ ....	....	....	....	4,332	3,653	3,057
	{ ....	....	....	....	2.5	1.7	4.5
Lumbermen, Raftsmen, Woodchoppers	{ 26,090	43,382	99,593	108,095	161,268	205,315	162,233
	{ 100.0	100.0	100.0	100.0	92.9	94.4	91.6
Owners and Managers of Log and Timber Camps	{ ....	....	....	....	7,931	8,410	6,899
	{ ....	....	....	....	4.6	3.9	3.9
Total	{ 26,090	43,382	99,593	108,095	173,531	217,378	177,189
	{ 100.0	100.0	100.0	100.0	100.0	100.0	100.0
MALE							
Foresters, Forest Rangers, and Timber Cruisers ....	{ ....	....	....	....	4,332	3,651	3,042
	{ ....	....	....	....	2.5	1.7	4.5
Lumbermen, Raftsmen, Woodchoppers	{ 26,090	43,382	99,593	107,882	161,191	205,036	162,138
	{ 100.0	100.0	100.0	100.0	92.9	94.4	91.6
Owners and Managers of Log and Timber Camps	{ ....	....	....	....	7,927	8,397	6,889
	{ ....	....	....	....	4.6	3.9	3.9
Total	{ 26,090	43,382	99,593	107,882	173,450	217,084	177,069
	{ 100.0	100.0	100.0	100.0	100.0	100.0	100.0
FEMALE							
Foresters, Forest Rangers, and Timber Cruisers ....	{ ....	....	....	....	....	2	15
	{ ....	....	....	....	....	.7	12.5
Lumbermen, Raftsmen, Woodchoppers .....	{ ....	....	60	213	77	279	95
	{ ....	....	100.0	100.0	95.1	94.9	79.2
Owners and Managers of Log and Timber Camps	{ ....	....	....	....	4	13	10
	{ ....	....	....	....	4.9	4.4	3.3
Total .....	{ ....	....	60	213	81	294	120
	{ ....	....	100.0	100.0	100.0	100.0	100.0

ownership and control of commercial lumbering, the introduction of new methods of lumbering (requiring fewer small camps), and the decline in the market for lumber have reduced the number of logging-camp owners and managers.

In Table 37 certain comparisons are made between lumber production and forestry workers.

FORESTRY AND FISHING

TABLE 37

COMPARISON OF LUMBER PRODUCTION AND NUMBER OF WORKERS IN
FORESTRY, 1900-1930

Item	1900	1910	1920	1930
Lumber production* (million board feet)	35,078 ^b	40,018 ^c	33,799	26,051 — 9,027
Percentage change		+14.08	-15.54	- 22.93 — 25.74
Forestry workers	108,095	173,531	217,378	177,189 +69,094
Percentage change		+60.53	+25.26	- 18.49 + 63.92
Foresters, rangers, cruisers.....		4,332	3,653	8,057 + 3,725
Percentage change			-15.68	+120.55 + 86.99 ^d
Lumbermen, raftsmen, wood-choppers		161,268	205,315	162,233 965
Percentage change			+27.31	- 20.99 .59 ^d
Owners and managers of logging camps		7,931	8,410	6,899 — 1,032
Percentage change			+ 6.04	- 17.93 — 13.01 ^d

* *Statistical Abstract of the United States, 1935*, pp. 55, 661, 'Lumber Production, Pulpwood Production.'

^b This figure is based on 1899.

^c *Statistical Abstract of the United States, 1910*, p. 252.

^d Based on 1930 over 1910.

The development of lumber production from 1869 to 1932 begins in the earlier year at less than 13 million board feet, reaches a maximum of 44 million in 1909 (owing in part to speculative overproduction), and declines to 12 million in 1932. When the broad trend of production is ascertained two phases appear—a steady rise to a maximum at about 1905 reflecting the rapid expansion of the country, and thereafter to 1930 a slow downward movement indicative of more stable conditions.¹

However, throughout this period the population of the country was continually increasing; hence the curve for per capita lumber consumption shows a much sharper fall in the later phase, amounting to one-third in twenty years, such that the figure for 1931 had declined to that which obtained in the early eighteen-forties. This later reduction in per capita consumption was due to several factors: man-hour production held a fairly steady course throughout the period from 1870 onward, prices rose, owing to depletion in Lake and Eastern regions (associated with the beginning of the Douglas Fir de-

¹ The percentage decline of lumber production from 1929 to 1934 is estimated at 61 (C. A. Bliss, *Production in Depression and Recovery*, National Bureau of Economic Research, Bulletin 58, November 15, 1935, p. 11).

velopment of the Northwest); substitutes appeared, such as steel and concrete, with an accompanying mechanization inapplicable to the lumber industry; and the greater fire hazard added its effect to the diminishing use of wooden construction.

Private ownership of forest land in 1937 comprised 80 per cent of the total, and private interests cut 98 per cent of the total cut in the country. The great majority of these private owners are primarily interested in the conversion of standing timber into cash and lack concern for timber cropping; they thus tend ultimately to introduce the grave problem of erosion.

As one writer puts it, "Therefore, the end of our virgin timber resources is in sight, if this destructive exploitation.... continues unchecked. All those communities and businesses established in lumbering centers will also cease to exist. it will be necessary for these communities to import their lumber requirements from other centers of production and to pay a much higher price than they have hitherto."²

The total number of forestry workers increased 64 per cent between 1900 and 1930, while lumber production fell 26 per cent in that time. However, substantial gains have been made in those occupations which are concerned with forest conservation and not lumber production.

In certain states, forestry work, either in state and national forests or in commercial lumbering, provides occupations for a considerable portion of the labor force. Forest areas and gainful employment for these states are shown in Table 38.

How important forest lands may be in a given locality is suggested by the expansion of the paper and cellulose industry in the Southern states.³ For example, a new factory opened in Savannah, Georgia, with a two-million-dollar annual payroll, doubling the income of that city of 95,000 inhabitants. For every man employed in paper factories two are required in the forests to cut and transport the wood for pulp. The 200,000 acres of suitable woodland in the South can be made to yield a continual supply of woodpulp. Favorable conditions there suggest the possibility that the cellulose industry may revolutionize Southern economy, with the result that forest workers will increase rapidly in number, their employment

² Mario G. Carbone, "Economic Difficulties of the Lumber Industry of the United States, 1850-1932," unpublished Ph.D. dissertation, Columbia University, 1937, p. 69. Facts reported above on production and consumption are from this excellent account.

³ Marc A. Rose, "King Cotton Shares His Throne," *Scribners Magazine*, October 1937.

TABLE 38
PRINCIPAL FOREST STATES AND THEIR WORKERS, 1930

State	Forest Area, Acres*	Percentage of Total	Percentage State Forest Workers Are of United States Forest Workers	Percentage Male Forest Workers Are of Total Gainfully Em- ployed in State
Washington	20,112,333	4.1	14.87	4.9
Oregon	27,198,923	5.5	9.35	5.0
Michigan	17,806,797	3.6	5.81	0.7
California	27,903,946	5.6	4.40	0.4
Louisiana	17,865,819	3.6	4.33	1.2
Mississippi	18,294,000	3.7	3.41	1.0
Florida	23,352,180	4.7	3.82	1.5
Wisconsin	15,084,652	3.1	3.30	0.6
Idaho	23,509,878	4.7	3.07	3.9
Arkansas	22,144,943	4.5	3.34	1.1
Maine	14,099,242	2.8	3.17	2.3
North Carolina	20,207,388	4.1	3.03	0.6
Total	247,580,101	50.0	61.90	...
Other States	247,629,642	50.0	38.09	0.23

* The figures are total acres represented by state forests (*Senate Document No. 12, 73d Congress, 1932, p. 825*); United States government forests (*Statistical Abstracts of the United States, 1931, p. 750*); and private forests (P. A. Stone and associates, *Economic Problems of Lumber and Timber Industry*, NRA Office, 1936, p. 280).

will remain fairly steady, and the production of pulpwood will advance the industrialization of the South.

What the ultimate effect of this already evident movement will be on the Southern labor force cannot be foretold, but it may reasonably be expected to mitigate the hardships of unemployment caused by the use of the mechanical cotton picker, the introduction of which⁴ will ultimately displace approximately half a million cotton pickers now living in the area being industrialized by the extension of the cellulose industry.

Foresters, Forest Rangers, Timber Cruisers

These forestry workers totaled 8,057 in 1930. From 1910 to 1930 they almost doubled in number. Within the boundaries of the national forest in 1930 were 183,975,930 acres, of which 22,885,113 belonged to state or private owners. This national forest domain is greater than the combined area of the thirteen Atlantic seaboard states extending from Maine to West Virginia. It contains a great reserve of building timber and pulp-

⁴ Roman L. Horne and Eugene G. McKibben, *Mechanical Cotton Picker*, WPA National Research Project, Report No. A-2, Philadelphia, Pennsylvania, August 1937.

wood and forms a large part of the watershed of the nation; its care and conservation is essential to the continued productivity of our agricultural lands.

Forest growths vitally affect the flow of streams, the industries dependent upon the power which they develop, and the health and economic well-being of persons living in places often quite remote from the forests themselves. One has only to recall the devastating loss of life and property caused by floods to be made aware of the importance of forests as a protection in preventing erosion and to realize what the denuding of forest areas means.

In recent years a new reason for forest conservation has become of vital importance, namely, the rapidly growing use of forest areas for recreational purposes. With the nation's people living predominantly in urban centers, and with the trend toward an expanding industrial economy, the need for natural recreational facilities in order to maintain the physical vigor and mental health of the population is being met in considerable part by providing accessible parks and recreational centers within national and state forests.

Thus the purposes of forest management are diverse, and in consequence the duties of those engaged as foresters and forest rangers have been augmented. The Division of Forestry was established in 1880. The administration of national forest reserves was transferred from the Department of the Interior to the Agricultural Department in 1905, where it has since become an important branch of that department. However, as a public agency the forestry service has been subjected to many pressures which have retarded the attempts to protect the forest domain from the ravages of fire and to promote its proper use by timbermen, grazers, and sportsmen. Wholly inadequate appropriations have prevented the employment of suitable personnel and still greatly hinder the accomplishment of the worthy purposes of this service. The federal forest appropriations of recent years⁵ are as follows:

Year	Federal Appropriation
1900	\$ 175,000
1910	4,697,731
1920	8,587,936
1930	19,530,196

⁵ Figures for 1910, United States Department of Agriculture *Annual Report*, p. 572; for 1920, *Estimate of Appropriations, 1920-21*, House Documents, IV, 267; for 1930, Treasury Department *Digest of Appropriations, 1931*, pp. 208-10.

The forestry service has undergone great changes since 1932. Its vast areas of virgin lands, possessing few fire trails and fewer roads, offered opportunity for the work of the Civilian Conservation Corps, and its great need for personnel and equipment made a just claim upon the large emergency funds available for government use during the depression. Even with this aid most of the forest-service personnel is still temporary, being employed during the fire-hazard season only. The development of a trained, competent labor force requires permanent employment; and much of the needed work can be put on an all-year basis. A greatly increased forest-service personnel will be needed to develop and properly conserve this vast domain.

As public sentiment is aroused to the importance of our natural heritage of forest, mountain, and stream, it is probable that the national and state governments will devote more of the public's money to forest conservation, with the result that there will be an increase in the number of persons engaged as forest workers. Their number more than doubled from 1920 to 1930. While the census registers a decline in the number of forest workers in 1920 as compared with 1910, this is largely due to the fact that the 1920 census was taken in January when temporary or part-time forest workers were not employed.

Here is an occupational group which is as yet very small but which could be increased several times over without fear of an oversupply of labor. It must be borne in mind that Forestry at present constitutes only .017 per cent of the nation's labor force, and that even though its development should continue with the same rapidity as in the last decade, Forestry cannot offer employment to any great portion of those seeking employment.

Lumbermen, Raftsmen, Woodchoppers

In 1930 this group comprised over 90 per cent of all persons in the Forestry category. Their work forced them to labor in isolated sections of the country, and the early methods of census-taking were such that data for the period prior to 1900 cannot be accepted as precise. Their work was frequently seasonal and supplemental to other occupations in which they engaged.

There were 21 per cent fewer workers engaged in lumber-

ing in 1930 than in 1920, and almost the same number as was reported in 1910. Whether or not this decline in the total labor force required in the lumbering and woodchopping industries will be continuous, when it will stop if stop it does, and what ultimate effect it will have upon the number of persons engaged as lumbermen, raftsmen, and woodchoppers cannot be determined. It is impossible to predict the effect of the diverse influences at work—the trend in building, the rate of substitution of other building materials for lumber, and the rate of displacement of wood fuel by the installation of coal-, gas-, or oil-burning heat-and-power units.

A considerable proportion of the decline is undoubtedly permanent, in both the amount of lumber produced and the number of lumbermen. It is likely to be most noticeable in the field of building lumber. On the other hand, the production and use of pulpwood for paper and cellulose may be on the threshold of an expansion which will greatly augment the number of persons engaged in woodchopping and logging.

Owners and Managers of Log and Timber Camps

Unification of plants and the general decline in lumber production since 1910 have reduced the number of owners and managers. By 1930 they were a small group of less than seven thousand persons, constituting less than 4 per cent of those engaged in forestry occupations. While most owners and managers are men, a few women are engaged in these occupations.

In the hardwood forests of the New England states logging has been carried on mainly through the use of small equipment units operated by independent owners or managers working woodlots containing only a few thousand feet of lumber.⁶ These small rigs are used also for woodlots on farms and for pole-cutting. The industry is in no way typical of the North Central, Southern, or Western logging operations. In these areas the forest acreage is much larger and logging is done on a grand scale. Logging firms are usually corporations managed by resident hired managers; camps which frequently number several hundred workers are set up, and sometimes mill towns are established.

Owners and Managers of Logging Camps has the same

⁶ Ralph C. Bryant, *Logging*, John Wiley and Sons, New York, 1913, pp. 418 ff.

probable future as does Lumbermen, Raftsmen, and Woodchoppers. A change may come in the Southern states. Farming activities may give way somewhat to the exploiting of woodlots for pulpwood production and thus augment the number of owners operating logging camps. Offsetting this possibility is the increasing use of fireproof building materials and oil fuels, with the consequent continuing decline in lumber and fuel-wood production.

The merging of private forest-land holdings into corporations and the development of mass production will continue to eliminate independent owners and to reduce the number of small logging camps. While a definite statement cannot be made, it is improbable that there will be any great increase in the number of managers and owners of logging enterprises, and it is quite possible that the decline already noted will continue for some time to come.

FISHERMEN AND OYSTERMEN

General Characteristics (Tables 39 and 40, Chart 9)

While the fishing industry attracted more workers in successive decades from 1870 to 1900, there was a decline in the number of fishermen and oystermen in both 1910 and 1920, and an unusual increase in 1930 to a figure above that of any previous census. How much the date of taking the census has affected this occupational trend cannot be determined. For example, the 1920 census was taken in January, while in 1910 and 1930 it was taken in April. An authority in the field is of the opinion that the seasonal variations in the different fishing regions perhaps balance one another.

From 1890 to 1920 the increase in the number of fishermen did not keep pace with the increase in the number of gainful workers, but from 1920 to 1930 the growth exceeded that of the total gainfully employed. The group of Fishermen and Oystermen is composed almost entirely of males. Evidently the work is little suited to women.

Fishing depends upon a supply of commercially valuable fish in streams, lakes, and oceans, and the habitat of such fish is fairly well known. Many states have few, if any, commercial fishermen; and the fishing industry has become established in certain areas where it is frequently of chief impor-

tance in offering employment to resident workers. In 1931 fishing operations were carried on as indicated in Table 39.

TABLE 39
LOCATION OF COMMERCIAL FISHING IN THE UNITED STATES, 1931*

Section	Catch				Fishermen	
	Amount (1,000 Pounds)	Per- cent- age	Value (Thou- sands of Dollars)	Per- cent- age	Number	Per- cent- age
New England	540,298	20.3	20,141	26.1	17,888	14.6
Middle Atlantic	164,899	6.2	9,211	11.9	9,604	7.8
Chesapeake Bay	293,271	11.0	7,428	9.6	20,689	16.8
South Atlantic and Gulf....	289,309	10.9	8,082	10.4	23,722	19.3
Pacific Coast	597,306	22.5	13,512	17.5	19,235	15.7
Great Lakes	91,727	3.5	6,029	7.8	6,839	5.6
Mississippi River and tribu- taries	82,382	3.1	2,898	3.7	15,884	12.9
Alaska	598,125	22.5	10,043	13.0	8,914	7.3
Total	2,657,317	100.0	77,344	100.0	122,775	100.0

* *Report of the Commissioner of Fisheries, 1932-33, Appendix, Part 2, "Fishery Statistics," 1931, pp. 164-65.*

This table shows roughly the importance and character of the American fishing industry. Because of its coastal waters and its proximity to the cod banks, the New England region is the center of the most valuable commercial fishing. The catch along the shore line of the Pacific Coast states is larger, however, and is second in commercial value. In both these areas, as in the great fishing operations of Alaska, the methods in use have been subjected to as much mechanization as the type of work will permit or the laws enforced to prevent fish depletion will allow. Surface fish are caught by hand lines and are also netted. Purse-seining is expanding. The gear used is heavier than formerly, and the hand-hauling apparatus has been transformed into power units where possible. Salmon are trapped wherever the law permits. Nevertheless, fishing operations must conform to the living, feeding, and breeding habits of the fish themselves, and in some branches of fishing it is impossible to use labor-saving mechanical devices.

In certain waters, principally inland lakes and streams, large-scale commercial fishing is unprofitable and the work is done by independent fishermen. This is reflected in Table

39. It will be seen that in the Great Lakes section, fishing yields 3.5 per cent of the total catch but employs 5.6 per cent of all persons engaged in fishing. Alaska, on the other hand, contributes 22.5 per cent of all fish caught but employs only 7.3 per cent of all fishermen.

Frequently the ruthless slaughter of commercial fish, or the destruction of their breeding grounds and natural food supply have combined with the forces of nature to effect a depletion of fishing areas. Through these agents, for example, together with unfavorable economic factors, the catch of salmon on the California coast has been greatly reduced; consequently salmon fishing has shifted northward.

The catch in the South Atlantic area increased from 106 million pounds to 332 million pounds between 1902 and 1919, a period during which the number of persons employed in commercial fishing in that area declined 36 per cent.⁷

Conservation laws and regulations are essential if the fishing industry is to be maintained on a permanent basis. Government regulation has already had much to do with changing the course of events and preventing widespread depletion. The enactment of further laws will undoubtedly affect the number of workers engaged in fishing. For example, legislation pending in California to regulate the processing of fishing for oil and fertilizer may reduce the number of fishermen, and territorial laws may be established to restrict further activities of salmon and halibut fishermen in Alaska.

The character of the fishing industry has undergone considerable change, and this also affects the number of persons engaged in its operations. For example, other commercial products have been substituted for whale oil and whalebone; whaling has declined from a production of 68,000 gross tons in 1870 to 6,900 gross tons in 1929.⁸ On the other hand, the use of fish oil for industrial purposes and fish meal for stock and poultry feeding has ushered in a whole new industry engaged in the reduction of vast quantities of fish which previously had little commercial value.

New quick-freezing methods and rapid transportation have greatly extended the commercial possibilities of the fish indus-

⁷ *Report of the Commissioner of Fisheries, 1921*, United States Department of Commerce, Bureau of Fisheries, Appendix, pp. 62-64.

⁸ Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, New York, 1934, pp. 288-89, Table 44.

try. Likewise the successful canning of many varieties of fish and the general acceptance by the consuming public of this product have combined to make fishing a stable industry. How its production and the number of its gainfully employed have altered are shown in Table 40.

TABLE 40
VOLUME OF PRODUCTION COMPARED WITH NUMBER OF FISHERMEN FOR
UNITED STATES AND ALASKA, 1908, 1930*

Item	1908	1930	Percentage Change 1930 over 1908
Fish production (million pounds).....	2,111	3,286	+55.6
Fishermen	157,218	119,716	-23.8
Population of United States (potential consumers of fish)	91,972,266 ^a	122,775,046	+33.6

* From Report of the Commissioner of Fisheries, 1932-33, Appendix, pp. 117-13.

^a Population figures for 1910.

What is true of trends in many other occupations also characterizes the fishing industry, namely, a great increase in productivity with a much smaller increase in the number of gainfully employed. In the twenty-two years from 1908 to 1930, fish production showed an increase of 55 per cent, while the number of fishermen decreased 24 per cent. Population for about the same period, 1910 to 1930, showed an increase of 33 per cent, which indicates that more fish were being consumed per capita while a relatively smaller number of people were engaged in this production.

From the trends of occupations and the economic outlook of the fishing industry it appears that relatively fewer new fishermen will be required in the immediate future to man even the greatly expanded fish industry which is in prospect of becoming a reality.

The following comment on the trend in employment in the fishing industry has been made for this text by Oscar E. Sette of the United States Bureau of Fisheries:

In my opinion, much of the growth of the fisheries, and hence the increase in employment, has been the result of tapping new fishery resources, either by expansion of fishing areas or by exploitation of species hitherto unused commercially. There are fewer such opportunities for expansion remaining now than were available during the period 1900-1930, and it seems unlikely that there will be any important increases in

employment in commercial fishing. On the other hand, there is increasing opportunity for gainful employment in the care of fishery resources and in the services connected with their recreational aspects. As a result of the greater strain on the fish resources imposed by commercial and sport fishermen, employment in fisheries research and in the administration and enforcement of laws has increased, but still lags behind the need, so that such employment should increase in the future as more adequate provision is made for it in state and federal budgets. Though no statistics are available, improved transportation facilities are reaching formerly inaccessible streams and lakes, thus providing an increasing field for fishing guides; and along both coasts, interest in marine sport fishing has gained considerably during the past two decades, causing greater numbers of persons to enter the business of running party boats for sport fishermen. Many of the latter are recruited from the ranks of the commercial fishermen. Therefore, employment supported by the fishery resources may continue to increase moderately, even though the number of commercial fishermen remains at about the present level.

CHAPTER IV

EXTRACTION OF MINERALS

General Characteristics (Tables 41-45, Charts 1, 6, and 9)

The extraction of mineral deposits from the soil in order to supply the fuel and raw materials upon which modern civilization so largely depends is one of the basic industries of our country. In 1930, there were 980,199 persons, or 2 per cent of all gainful workers, listed in such industries. A negligible fraction of them were women.

The trend in the occupations which utilize the services of these "extractors of minerals" during the successive decades from 1870 to 1930 is indicated in Table 41.

TABLE 41
PERCENTAGE CHANGE IN NUMBERS OF WORKERS LISTED IN EXTRACTION OF
MINERALS COMPARED WITH THAT OF ALL GAINFUL
WORKERS, 1870-1930

Decade	Workers in Extraction of Minerals	All Gainful Workers
1870 .....	.....	.....
1880	+51.5	+39.1
1890	+54.4	+30.7
1900	+46.7	+27.9
1910	+65.2	+31.3
1920	+12.9	+9.0
1930	-16.3	+17.3
1930 over 1870...	+478.3	+290.5

In absolute numbers this is a sharply expanding group of gainfully employed persons. In terms of the decennial increase large advances were made after 1870 until the decade ending in 1920; thereafter a noticeable decline was evidenced. The decennial percentage increase of this category until the 1930 census was considerably greater than that of all gainful workers.

However, in percentage of the total gainfully employed through these decades, Extraction of Minerals increased only a fraction of one per cent until 1920. During the decade from 1920 to 1930 there was a relative as well as an absolute decrease in the number in these occupations. The present trend is well summarized by F. G. Tryon in a recently published analysis of the problem as follows:

EXTRACTION OF MINERALS

In coal mining the forces making for labor displacement are strong enough to be a cause of some concern. In metal mining the chances of expansion in employment beyond the 1920's seem unfavorable. In oil and gas, on the other hand, the trend points to an increase in total labor requirements Taking the mineral industries as a group, there seems little chance that the total demand for labor will rise greatly above the level of the 1920's.¹

TABLE 42

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN EXTRACTION OF MINERALS, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Foremen, Overseers, and Inspectors .....	{ ....	....	....	....	23,338	36,931	34,286
Operators, Officials, and Managers .....	{ ....	....	....	....	2.4	3.4	3.5
	{ ....	....	....	....	25,234	34,325	30,896
	{ ....	....	....	....	2.6	3.2	3.2
Coal Miners	{ 72,363	126,019	208,545	344,205	613,924	733,938	621,661
	{ 43.0	49.1	52.6	59.2	63.9	67.7	63.4
Miners Other than Coal	{ 79,244	108,209	141,047	184,617	191,906	148,847	122,844
	{ 46.8	42.1	35.6	31.8	20.0	13.7	12.5
Quarry Workers	{ 13,589	15,169	37,656	34,584	80,840	45,162	65,288
	{ 8.0	5.9	9.5	5.9	8.4	4.2	6.7
Oil- and Gas-Well Workers	{ 3,803	7,340	9,147	13,011	25,562	85,550	105,224
	{ 2.2	2.9	2.3	8.1	2.7	7.9	10.7
Total	{ 169,499	256,737	396,395	581,417	960,804	1,084,751	980,199
	{ 100.0	100.0	100.0	100.0	100.0	100.1	100.0

TABLE 43

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN EXTRACTION OF MINERALS, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Foremen, Overseers, and Inspectors .....	{ ....	....	....	....	23,328	36,923	34,274
Operators, Officials, and Managers .....	{ ....	....	....	....	2.4	3.4	3.5
	{ ....	....	....	....	25,127	34,143	30,755
	{ ....	....	....	....	2.6	3.2	3.1
Coal Miners	{ 72,337	125,972	208,330	343,561	613,519	732,441	621,545
	{ 43.0	49.1	52.6	59.2	63.9	67.7	63.4
Miners Other than Coal	{ 79,224	108,177	140,914	184,315	191,726	148,471	122,798
	{ 46.8	42.1	35.6	31.8	20.0	13.7	12.5
Quarry Workers	{ 13,589	15,169	37,628	34,521	80,795	45,064	65,283
	{ 8.0	5.9	9.5	5.9	8.4	4.2	6.7
Oil- and Gas-Well Workers	{ 3,802	7,340	9,137	13,001	25,548	85,303	105,212
	{ 2.2	2.9	2.3	8.1	2.7	7.9	10.7
Total	{ 169,452	256,658	396,009	580,418	960,043	1,082,365	979,847
	{ 100.0	100.0	100.0	100.0	100.0	100.1	99.9

¹ F. G. Tryon, *et al.*, *Technology and the Mineral Industries*, WPA National Research Project and Bureau of Mines, United States Department of the Interior, Report No. E-1, Philadelphia, Pennsylvania, April 1937, pp. v, vi.

TABLE 44
NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN EXTRACTION OF MINERALS, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Foremen, Overseers, and Inspectors .....	{ ....	....	....	....	10	8	12
Operators, Officials, and Managers .....	{ ....	....	....	....	1.3	.3	3.4
	{ ....	....	....	....	107	182	141
	{ ....	....	....	....	14.1	7.6	40.1
Coal Miners	{ 26	47	215	624	405	1,495	116
	{ 55.3	59.5	55.7	62.5	53.2	62.7	33.0
Miners Other than Coal	{ 20	32	133	302	180	376	46
	{ 42.6	40.5	34.5	30.2	23.7	15.8	13.1
Quarry Workers .....	{ ....	....	28	63	45	78	25
	{ ....	....	7.3	6.3	5.9	3.3	7.1
Oil- and Gas-Well Workers	{ 1	....	10	10	14	247	12
	{ 2.1	....	2.6	1.0	1.8	10.4	3.4
Total	{ 47	79	386	999	761	2,396	352
	{ 100.0	100.0	100.1	100.0	100.0	100.1	100.1

TABLE 45
WORKERS IN EXTRACTION OF MINERALS: PERCENTAGE OF TOTAL POPULATION
AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.440	.512	.633	.765	1.045	1.026	.798
All gainful workers, male and female....	1.355	1.476	1.743	2.000	2.517	2.607	2.007
[Males of]							
All male gainful workers	1.588	1.741	2.104	2.443	3.190	3.273	2.573
[Females of]							
All female gainful workers .....	.003	.003	.010	.019	.009	.028	.003

If this prophecy be true, then the number of workers engaged in extracting minerals will remain at approximately a million. The personnel in this field of work is almost exclusively masculine.

The distribution of workers is geographically related to the mineral deposits being exploited. These workers are therefore located in certain areas where they are frequently the most numerous and sometimes almost the only gainfully employed persons. Table 46 shows the relative importance of the mining states in each type of mineral extraction.

In 1930 Pennsylvania was the leading mining state in the Union, having 43 per cent of all coal miners, 17 per cent of

EXTRACTION OF MINERALS

TABLE 46

NUMBER AND PERCENTAGE DISTRIBUTION OF WORKERS IN EXTRACTION OF MINERALS BY TYPE OF MINING AND BY STATES, 1930*

Type and State	Number of Workers	Percentage of Specified Group of Miners
<i>Coal mining</i>		
Pennsylvania	267,724	43.07
West Virginia	97,521	15.69
Kentucky	54,315	8.74
Illinois	54,137	8.71
Ohio	27,616	4.44
Alabama	23,965	3.85
Virginia	12,630	2.03
Indiana	15,406	2.48
Colorado	10,134	1.63
All other states.....	58,097	9.36
		100.00
<i>Gold and silver mining</i>		
California	7,075	38.97
Colorado	2,537	13.98
Nevada	1,736	9.56
South Dakota	1,044	5.75
Utah	1,418	7.81
All other states.....	4,338	23.94
		100.01
<i>Iron mining</i>		
Michigan	7,927	32.69
Minnesota	8,593	35.44
Alabama	4,396	18.13
All other states.....	3,329	13.74
		100.00
<i>Quarrying</i>		
Pennsylvania	10,962	16.79
Missouri	3,941	6.04
Ohio	4,607	7.06
New York	3,665	5.61
Tennessee	2,678	4.10
Vermont	2,034	3.12
Michigan	1,555	2.38
Indiana	3,872	5.93
Alabama	1,041	1.59
All other states.....	30,908	47.38
		100.00
<i>Oil and gas wells</i>		
Oklahoma	26,628	25.30
Texas	23,372	22.21
California	20,984	19.94
Pennsylvania	6,132	5.82
Louisiana	5,197	4.93
All other states.....	22,899	21.77
		100.00

* Compiled from *Fifteenth Census of the United States, 1930, "Population," Vol. IV, "Occupations by States."*

all quarry operatives, and 30 per cent of all persons in the United States who were engaged in the extraction of minerals. While extractors of minerals numbered only 2 per cent of the total of gainful workers in this country, in 1930 they comprised 8 per cent of the labor force of Pennsylvania.² The presence of rock and coal deposits in that state adds much to its desirability as a manufacturing region. Manufacturing, mechanical, and extraction of mineral pursuits claim 40 per cent of the available labor in Pennsylvania, as compared with 30 per cent for the United States as a whole.

Of all coal miners 80 per cent were located in the states of Pennsylvania, West Virginia, Kentucky, Illinois, and Ohio. The mining of precious metals, on the other hand, is centered largely in the Rocky Mountain and Sierra Nevada areas, almost 40 per cent of the gold and silver miners working in California alone in 1930.³ Iron mining is centralized in the Great Lakes region, with 68 per cent of all iron miners located in Minnesota and Michigan. Quarrying, except for its predominance in Pennsylvania, is rather evenly distributed over many states, some quarries being located at opposite ends of the geographic map of the United States. Oil and gas wells are situated principally in Oklahoma, Texas, and California, 67 per cent of the petroleum wells being located in these three states in 1930.

From Table 42 it appears that coal mining (which in 1870 employed fewer workers than the metal-ore mining) in 1930 furnished employment to by far the greatest number of all miners, using approximately two-thirds of all who make their living in this type of occupation. Metal-ore mining (which in 1870 employed 47 per cent of all miners) in 1930 engaged only 12 per cent. The percentage of oil and gas workers, on the other hand, increased from 2.2 per cent in 1870 to 10.7 per

² John D. Beatty and Herbert L. Grau, *Occupational Changes and Relief Activities in Allegheny County*, Pittsburgh Personnel Association, March 1934, p. 3.

³ According to a report made by the WPA National Research Project and the Bureau of Mines in 1937 (*Small-Scale Placer Mines as a Source of Gold, Employment, and Livelihood in 1935*, pp. 1, 3), "California had over half of the small-scale gold miners in the U.S. In 1932 the number of small-scale placer miners in California was approximately 12,000 persons and the average gross earnings for each miner were \$41.12 for the year." Another study (*Grade of Ore*, pp. 20 ff.) made by the same project states that placers supply only a fifth to a fourth of the gold: "The output of dry and siliceous ores from states west of the Mississippi ranged from 50 to 85 per cent of the total output of these ores For these states the gold recovered showed a general pronounced decline for the period 1910-1929 followed by four years of selective high yields there were over 5,000 mines supplying the ores [gold and silver] in 1935. Just as in the frontier days, most of these mines are small enterprises in which the equipment is crude There are some large enterprises, however In these technology is fully applied and it is no longer considered marvelous that one part of gold is obtained at a profit from 850,000 parts by weight of ore."

cent in 1930. In 1930 the number of quarry workers comprised approximately the same percentage of workers in mineral extraction as in 1870.

Table 47 pictures broadly the relationship which has been attained between the quantity of mineral production and number of workers involved during the period 1870-1930.

While admittedly incomplete, Table 47 permits certain pertinent observations to be made concerning rates of production and increases in number of workers. Gold, mercury, and pyrites are the only items in this long list of mineral products which declined in volume of output in 1930 as compared with that of 1900 or with that of 1870. All the others increased continually, but not comparably. In all these data there can be observed the important phenomenon of an increased output without a corresponding expansion of the labor force available for that production. For example, coal mined in the United States and coal miners listed among the gainful workers increased in the following way:

Census	Percentage Increase over Previously Indicated Census	
	Coal (Million Short Tons)	Coal Miners
1870 .....	.....	.....
1900	717.3	372.4
1930	125.7	80.6
1930 over 1870.....	1,744.8	753.2

This trend is even more marked with respect to certain other minerals. In fact, the number of miners available for extraction of all minerals other than coal showed a decrease of 33 per cent in 1930 as compared with 1900, whereas production in all excepting the precious metals, mercury, and pyrites, has rapidly increased. The decline in the production of these precious metals probably accounts for the noticeable drop in the labor force engaged in mining minerals other than coal.

The great new industry of oil and gas production has experienced phenomenal increases since 1870, in both production and the number of workers engaged. Even here, however, improved methods of extraction permit a large increase in output without a corresponding increase in number of workers.

A summary analysis of what is occurring in production and use of labor in mining pursuits shows that mining output in 1929 was 5.5 per cent above 1920, but man-days worked in

EXTRACTION OF MINERALS

121

TABLE 47

COMPARISON OF MINERAL PRODUCTION AND NUMBER OF GAINFUL WORKERS,
1870-1930*

	1870		1900		1930		Percentage Change 1930 over 1870
	Number	Number	Percentage Change	Number	Percentage Change		
<i>Coal</i>							
Million short tons	33.0	269.7	+ 717.3	608.8	+ 125.7	+ 1,744.8	
Coal Miners	72,863	344,205	+ 372.4	621,661	+ 80.6	+ 753.2	
<i>All other mines</i>							
Copper, million pounds	28.0	606.0	+ 3,064.3	3,003	+ 230.5	+ 7,053.6	
Gold, thousand ounces	2,419	3,630	+ 50.1	2,208	- 39.2	- 8.7	
Silver, million ounces	12.4	57.6	+ 364.5	61.3	+ 6.4	+ 394.5	
Lead, thousand short tons	17.8	260.9	+ 1,365.7	672.5	+ 157.8	+ 3,678.1	
Mercury, thousand flasks	30.7	28.9	- 5.9	24.0	- 17.0	- 21.8	
Zinc, thousand short tons	5.4	123.9	+ 2,194.4	625.4	+ 404.8	+ 11,463.0	
Asphalt, thousand short tons		54.4	.....	804.0	+ 1,377.9	.....
Iron ore, million long tons	7.1	27.6	+ 288.7	73.0	+ 164.5	+ 928.2	
Pyrites, thousand long tons		204.6		164.4	- 19.7		
Salt, million barrels ..		20.9		61.0	+ 191.9		
Sulphur, thousand long tons		3.1		2,362.4	+ 76,206.5		
Miners Other than Coal Miners	79,244	184,617	+ 133.0	122,844	- 33.4	55.0	
<i>Oil and gas wells</i>							
Petroleum, million barrels	5.3	63.6	+ 1,100.0	1,007.3	+ 1,483.8	+ 18,905.7	
Natural gas, billion cubic feet		237.0		1,918.0	+ 709.3	.....
Oil and Gas Workers..		18,011	+ 373.6	105,224	+ 484.2	+ 2,666.9	
<i>Quarrying</i>							
Phosphate, thousand long tons	65	1,491	+ 2,193.8	3,761	+ 152.2	+ 5,686.2	
Cement, thousand barrels		17,231		172,856	+ 900.3		
Fluorspar, thousand short tons		18.4		146.4	+ 695.7		
Gypsum, thousand short tons		594.0		5,016	+ 744.4		
Quarry Workers	13,589	34,584	+ 154.5	65,288	+ 88.8	+ 380.4	

* This table is constructed from census figures on gainful workers, and from Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, New York, 1934, Appendix A.

mines to produce this increased output were 17 per cent less than in 1920. Production had dropped 34 per cent by 1934 as compared with 1920, but man-hours employed in that production had decreased 47 per cent. Thus, on either a rising or a falling market, man power used in mining lags considerably behind output.⁴

In no small measure has the abundance of essential metals been responsible for the prodigious industrial development of the United States. The extraction and use of metals has been characterized by a wastefulness which only our opulence has prevented from having serious consequences.⁵ As F. G. Tryon graphically puts it, "The consumption of minerals in the twenty years ending in 1929 was greater than that of the three hundred years from the landing of Captain John Smith in 1607 to the Jamestown Exposition."⁶ The development from the census of 1900 to that of 1930 shows that mineral production advanced more rapidly than any other major aspect of American economic life. This is indicated in Table 48.

However, evidences are already discernible which point to a slackening in the remarkable production trend during this period. While certain products like petroleum, gas, and sulphur showed continued rapid production increases, others such as gold,⁷ lead, and pyrites showed actual declines. No safe prediction can be made concerning iron ore and coal because great quantities of scrap iron are being made available each year for resmelting, which reduces the need for new iron ore, and changed methods of producing power and heat are making great inroads into the coal markets. The effect of these alterations upon the labor force engaged in the extraction of minerals is already seen in the tables presented in this chapter, but such changes will probably become more pronounced as time goes on.

⁴ David Weintraub and H. L. Posner, *Unemployment and Increasing Productivity*, WPA National Research Project, Report No. P-A, March 1937, p. 36.

⁵ F. G. Tryon and Margaret H. Shoenfeld, "Utilization of Natural Wealth," in *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 59.

⁶ *Ibid.*

⁷ The net percentage increase in gold production from 1929 to 1934 is placed at 40.8, a consequence of government price stimulation (C. A. Bliss, *op. cit.*, p. 15). See also *Mineral Technology and Output per Man Studies: Grade of Ore*, WPA National Research Project and Bureau of Mines, Report No. E-6, p. 33: "For practically a hundred years gold had been held at about \$20.67 a fine ounce, and the series of price advances that began in 1933 (ultimately representing a premium of about 70 per cent over the old price by 1935) brought powerful forces into operation. The normal attraction for production of a commodity with a fixed price and maintained demand during a depression was reinforced by increasing the price itself."

TABLE 48

COMPARISON OF MINERAL PRODUCTION WITH OTHER ECONOMIC AND SOCIAL FACTORS, 1929 OVER 1899

	Percentage Increase 1929 over 1899
Population of United States.....	62.0
Volume of agricultural production.....	48.0
Volume of manufactures.....	210.0
Transportation—railroad tons-miles	238.0
Mining production ^a	286.0

^a The over-all percentage decrease in the production of minerals from 1928 to 1935 has been estimated at 19, but this figure conceals wide differences among the several minerals. (C. A. Bliss, *Production in Depression and Recovery*, National Bureau of Economic Research, Bulletin 58, November 15, 1935.)

Although the data are too meager to indicate adequately what is taking place, known facts suggest that by 1926 scrap or secondary metal supplied industry with 38 per cent of its aluminum, 35 per cent of its copper, 31 per cent of its antimony, 28 per cent of its tin, 23 per cent of its lead, and 19 per cent of its zinc.⁸ While more steel is consumed now than two decades ago, there is a noticeable decline in the rate of growth of pig iron production; this occurs probably because of the increasing use of scrap iron. Figures on the production of virgin pig iron and finished steel and iron lead to the conclusion that as much as 30 to 35 per cent of the iron used in making rolled iron and steel is recovered from scrap.

In the field of precious metals, hoarding and recovery are even more noticeable. The presence of this revolving fund of metals helps to supply the demand and retard the commercial development of low-grade ore deposits and the increase in the number of workers needed.

One of the greatest forces influencing the number of workers needed in the extraction of minerals is the technological development taking place in this branch of industry. This is true of the discovery and exploration of new mineral deposits, just as it is of the large-scale mining of low-grade ores. Surface prospecting with pick, shovel, and pan, so far as profitable discoveries are concerned, is apparently a thing of the past in the United States.⁹ In fact, discovery of precious-metal

⁸ F. G. Tryon and Margaret H. Shoenfeld, *op. cit.*, p. 74.

⁹ "Apparently the possibility of going to work without finding an employer made a tremendous appeal to the jobless.... In 1935 the number of small-scale gold placer operators in the United States was 28,022, the average number of days worked was 45, the value of the gold produced was \$2,014,503, an average gross value of gold per miner, \$72.00." (*Small-Scale Placer Mines as a Source of Gold, Employment, and Livelihood in 1935*, WPA National Research Project and Bureau of Mines, Report No. E-2, pp. 2, 4.)

deposits has slowed down perceptibly. Of the 33 largest metal districts in this country, only 5 have been discovered since 1900 and none since 1907.¹⁰ Discovery of oil deposits, on the other hand, which depends so much on the use of modern geological knowledge, is increasing; for, of the 50 largest pools now being exploited, 20 were discovered in the decade 1920-1930. The known mineral deposits of iron and the available supply of coal suitable for commercial development are much in excess of present needs, hence the factor of supply is no hindrance to the employment of labor in mining these deposits.

In coal mining much saving in labor per ton of coal produced is secured through the use of open strip mining. By this method steam or electric-power shovels remove the surface rock and soil, expose the coal, then shovel it into trucks or cars to be transported to its destination. In the last twenty years the capacity of a single shovel has increased from 4 cubic yards to 32. Since 1910 the tons of bituminous coal mined by this method have increased from none to approximately twenty million tons. This represents about 5 per cent of the total coal mined. Less than six million tons of anthracite are mined by the open-pit method, or approximately 10 per cent of the total. Such methods reduce the labor needs by a half to two-thirds. The area which can be mined profitably by this method has not been determined, but engineers estimate that a considerable number of coal fields will be subjected to this mode of operation as time goes on.¹¹

In 1891, 5 per cent of the coal mined underground¹² was cut by machines; this method has been advanced to the point where it now accounts for approximately 84 per cent. From a daily output of slightly more than one and a half tons cut by each man per day in 1890, the output advanced to 4.7 tons per day in 1930.

Cutting and loading operations are the work which engages the time of most coal miners. Mechanical loading also is rapidly taking the place of hand methods in coal mines. While

¹⁰ K. C. Heald, "The Technique of Exploration," in *Technology and the Mineral Industry*, WPA National Research Project and Bureau of Mines, Report No. E-1, April 1937, pp. 6 ff.; also F. G. Tryon and Margaret H. Shoenfeld, *op. cit.*

¹¹ *Mechanization Trends in Metal and Nonmetal Mining as Indicated by Sales of Underground Loading Equipment*, WPA National Research Project and Bureau of Mines, Report No. E-3, June 1937, p. 1.

¹² F. G. Tryon, "Technology in Coal Mining," in *Technology and the Mineral Industry*, WPA National Research Project and Bureau of Mines, Report No. E-1, April 1937, p. 14.

machines load only approximately 20 per cent of the anthracite and 14 per cent of the bituminous coal, the aggregate is so high in some states as to indicate the industrial success of machine loading and the eventual displacement of hand labor.¹⁸ In 1935, 90 per cent of Wyoming's anthracite coal production was mechanically loaded, 62 per cent of Indiana's, 56 per cent of Illinois', and 21 per cent of Pennsylvania's.

An average annual production of underground anthracite coal is 60 million tons and of bituminous 475 million tons. If ultimately most of the former and all of the latter is to be handled mechanically, it can be conjectured what will happen to many of the more than 600,000 men who now mine the coal produced in the United States. But while the sale of mining tools for cutting coal and of mechanical loaders is rapidly advancing, relative high costs of machinery, wage rates, and prices of coal will probably keep displacement of workers from occurring immediately. Even so, mechanical efficiency is essential to the successful operation of many coal mines working in competition with other mechanized mines, especially in the face of higher wage bills for hand-worked mines.

What the ultimate effect of these technological changes upon the labor force will be is not apparent. In certain mines where machine loading has entirely supplanted hand loading, man-hours per ton of produced coal have been reduced 35 per cent. Yet when coal is mined by machine much of the debris which was formerly discarded by the miners when hand methods were used is left in it, and it becomes necessary to install other machines to clean the coal. Perhaps changes in fuel used in industry, and generally depressed business conditions, cause a decrease in the labor employed in mining coal more than do other causes. The former is apt to produce permanent changes in the need for coal miners, the latter is probably a transitory but recurring factor.

Mining of metals is particularly subject to depletion of deposits in certain areas, necessitating removal of operations to more virgin fields. In some instances, as in gold mining, when new fields cannot be discovered, actual curtailment of mining and permanent displacement of workers occurs. Likewise the extraction of sulphur has shifted from the early dis-

¹⁸ L. N. Plein, *Mechanization Trends in Metal and Non-Metal Mining as Indicated by Sales of Underground Loading Equipment*, WPA National Research Project, Report No. E-3, Philadelphia, Pennsylvania, June 1937, p. 1.

covered rich deposits of Louisiana to Texas. The center of natural-gas production has moved from Pennsylvania and Ohio into West Virginia. Certain coal-mining areas in Pennsylvania have been worked to the point where their yield is so small that it is no longer profitable for mining companies to operate them. Their abandonment has left stranded thousands of persons whose entire lives have been spent in these coal-mining areas and who are wholly untrained for other work. They eke out a miserable existence "bootlegging" coal stolen from the mines. The social and economic consequences of these conditions are among the most frightful in America. Observers are agreed that only some national plan involving the migration of an entire population and their retraining for other forms of useful work will suffice to adjust these people to the changes wrought by the depletion of the commercial coal supply upon which they have so long been accustomed to depend for their entire existence.

Technological advances have altered the whole course of petroleum production. Whereas methods and equipment formerly permitted successful drilling of wells only two to five thousand feet deep, now wells twice that depth are not uncommon. Slant-hole drilling can be done as well as straight-hole boring. The modern use of geological knowledge has made possible the discovery of oil deposits which were unknown twenty years ago. Heavier and more accurate equipment allows old areas to be brought into commercial production again and new fields to be more fully exploited. Natural gas present in oil wells is now used extensively to force the oil from its natural reservoir. New processes of refining and grading oils are being advanced which increase their use and commercial value.

As long as the uses to which petroleum and its products are put continue to multiply and as long as the public demand expands with such rapidity as is visible in the figures on petroleum production in Table 47, technological changes can hardly be expected to reduce the number of oil- and gas-well workers materially. In fact, as new fields are discovered and brought under production there is every likelihood that the increase in the number of such workers will continue. While there is the possibility of the introduction of motor fuel made from coal and oil shale to supplant gasoline, as long as the abundance of

cheap petroleum continues there is little probability of this occurring.¹⁴

Nor have the quarrying processes escaped the advance of industrial science. Besides mechanical loading and open quarrying with power shovels, new inventions have altered production so greatly that the output per worker is even higher in extraction of other minerals than in the coal and metal mines.¹⁵ One such invention is known as the Frasch process whereby hot water injected into sulphur deposits melts the sulphur and forces it to the surface. Another is a wire saw for cutting building slate—an appliance long known and used in Europe.

The cement industry, the largest in terms of value of all the nonmetallic group, increased its per-man-hour output from less than three-tenths of a barrel in 1899 to over two barrels in 1929. By 1936 continued technological improvements had increased man-hour productivity 28.7 per cent over the peak of production in 1929.¹⁶ Many plants have been merged into large units, permitting numerous labor-saving installations, the average output per plant having increased from 145,000 barrels of cement in 1899 to a million barrels in 1929.

Foremen, Overseers, Inspectors

For some unknown reason the Bureau of the Census segregates Foremen, Overseers, and Inspectors from each of the subdivisions of workers in Extraction of Minerals. In so doing, the supervisory personnel has been removed from the type of operations which it supervises, with the result that the proportion engaged in coal mining cannot be distinguished from that working in quarrying or the other pursuits in mining.

This group expanded rapidly in the decade from 1910 to 1920 but decreased somewhat by 1930. The decline in 1930 over 1920, 7 per cent, may be accounted for partly by the slack in mineral production at the beginning of the depression, partly by the consolidation of properties and operations. These fore-

¹⁴ K. C. Heald, "Petroleum and Natural Gas," in *Technology and the Mineral Industries* (F. G. Tryon et al.), WPA National Research Project and Bureau of Mines, Report No. E-1, April 1937, pp. 22 ff. The over-all percentage decrease in the production of petroleum from 1929 to 1934 is estimated to have been no more than 10 per cent (C. A. Bliss, *Production in Depression and Recovery*, National Bureau of Economic Research, Bulletin 58, November 15, 1935).

¹⁵ Oliver Bowles, "Non-Metallic Materials," in *Technology and the Mineral Industries*, WPA National Research Project and Bureau of Mines, Report No. E-1, April 1937, pp. 32-33.

¹⁶ *Production, Employment and Productivity in 59 Manufacturing Industries*, Part Two, WPA National Research Project, Report No. S-1, Washington, D.C., 1939, p. 35.

men, overseers, and inspectors are only a fractional part of the total of gainful workers, but they make up a growing percentage of all workers engaged in the extraction of minerals.

The conclusion reached by the staff of experts whom the government asked to analyze labor trends in mineral industries is that the advance in technology, the increased mechanization of mining, and the increase in the number of large-scale units of operation offer real possibilities for the expansion of supervisory and managerial occupations.¹⁷

Operators, Officials, Managers

Practically all of the larger mining companies are stock concerns, but in the field of small-scale mining and quarrying, as well as in a few isolated oil-well ventures, some individual owners are found. This group, consequently, while inclusive of all three, is primarily made up of officials and managers. The group advanced in absolute numbers in 1920 over 1910 and declined somewhat in 1930. With respect to the total number of workers engaged in the extraction of minerals, however, it maintained its relative position in 1930 as compared with 1920. Its future is unpredictable, owing to lack of sufficient data covering a long period of time and because the effect of mergers in mine properties, technological changes, and alterations in business practices cannot be forecast.

Coal Miners (Table 49)

Coal Miners constitutes the most important single laboring group within the Extraction of Minerals category. In addition to what has already been indicated in this chapter concerning coal miners, these tables show that their number increased slightly in proportion to the total number of all gainful workers from 1870 to 1920, and decreased from 1920 to 1930. The trend is practically the same within their own category of Extraction of Minerals. Even at their peak number, coal miners constituted only 1.7 per cent of all gainful workers. There is the possibility, as business conditions improve, that the loss since 1920 will be recovered. But qualified specialists, in summarizing the several influences at work in the field of coal mining, see little hope that within the present decade there will be any substantial increase.

¹⁷ Opinion of the survey staff, quoted on page 59, *Technology and the Mineral Industries*, WPA National Research Project and Bureau of Mines, Report No. E-1, April 1937.

TABLE 49

COAL MINERS: PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930*

Base	1870	1880	1890	1900	1910	1920	
All gainful workers, male and female*....	.583	.725	.917	1.184	1.609	1.764	1.273
All male gainful workers .....	.683	.854	1.107	1.446	2.039	2.215	1.632

* Coal Miners transferred from Fishing and Mining (Manufacturing and Mechanical Industries) in 1870, 1880, 1890, and 1900 estimated.

* Number of women so small as to have only minor significance; see Table 44.

Miners Other than Coal

In this group a decline is to be noticed in comparison with all gainful workers from 1870 to 1890, a slight increase in 1900, and a diminution in the successive censuses so sharp that by 1930 these miners comprised less than half the percentage of all gainful workers that they were in 1870. In terms of actual numbers, however, there are many more such miners than in 1870 but fewer than in any census since 1890.

At no point in the span of time shown in these data did this mining group constitute more than a minute fraction of all workers; yet in 1870 they were almost half of all persons engaged in the extraction of minerals, of which labor force they were only 12.5 per cent in 1930. No sudden or substantial increase in the number of noncoal miners can be expected in the near future.

Quarry Workers

Quarry workers have actually increased in numbers despite many changes in quarrying operations and despite alterations in the use of building materials. From 1870 to 1930 the whole number of quarry operatives increased somewhat in comparison with all gainful workers. The course of development, however, has not been steady; the oscillations of the trend indicate that as new products of quarrying, such as phosphates and cement, have made sudden demands for more labor, changes in methods of production have tended to reduce these demands.¹⁸ These oscillations also appear in the percentage of workers in all mining occupations.

¹⁸ According to the "Mineral Technology and Output per Man Studies" made by the WPA National Research Project in co-operation with the Bureau of Mines (pp. 1 and xiii,

Judging by present conditions in this field, the supplies of raw materials available, and the scientific changes and business unification under way, the present trends will probably continue for some time. Because of the relatively small size of this labor force, however, the demand will not materially affect the total of the gainfully employed.

Oil- and Gas-Well Workers

It has already been remarked that these workers have assumed a more exalted place in the total number of extractors of minerals. Despite all economic disturbances, advancing techniques, and improved methods of business operation, petroleum and gas-well operatives have increased rapidly in actual numbers. This increase was noticeable from 1870 onward but became accentuated after 1900, when the discovery of extensive oil deposits and the requirements of the automobile and the newer possibilities in motor fuel and heating caused revolutionary changes.

While these occupations are so basic to industrial developments that they have had a major effect upon a large proportion of the gainfully employed, in themselves they employ only a fraction of one per cent of all gainful workers. They remain almost exclusively occupations for male workers. The outlook for the future, already described in part, points to an increase in the number of oil- and gas-well workers for some time to come. Whether that increase will ever again advance with such rapidity as it did between 1910 and 1930 depends upon discoveries of new oil fields and upon a greatly developed demand for oil products. At the moment neither is in sight.

Phosphate Rock Mining, 1880-1937: "The number of workers increased with the expansion of production until shortly before the World War but dropped steadily thereafter except in a few years. . . . Output per man-hour in the phosphate rock mining industry has increased more than nineteen fold since 1880. . . . One of the major developments of recent years which contributed to this increase is the concentration of production in the largest most-mechanized mines. Another is the rapid growth in the use of mechanical power. Both types of change exemplify changes to be found in the mineral industries in general." And according to *Changes in Technology and Labor Requirements in the Crushed-Stone Industry*, p. 4: "Employment in crushed-stone production gained rapidly in the early years of the present century, because the vigorously growing new technology did not increase output per man quickly enough to keep pace with the enormous expansion in demand. The spectacular increase in the production of crushed stone from 1898-1905 and the continued rapid rise in the decade following were accompanied by a large gain in the number of men employed. . . . from 1913 there was a decline in employment despite expanding markets, due to greatly increased output per man."

CHAPTER V

MANUFACTURING AND MECHANICAL INDUSTRIES

INTRODUCTION

General Characteristics (Tables 50 to 53, Charts 1, 6, and 10)

Manufacturing industries employ the largest single category of American workers. The industrial classification of the census of 1930 showed 14,341,372 persons in the Manufacturing and Mechanical group; this was 29.4 per cent of all workers in the country. The occupational classification of the same census recorded 13,620,875 workers in this category in 1930; this was 27.9 per cent of the national labor force.

Composition of the Manufacturing and Mechanical Category

These workers have been divided in this study into fourteen major groups, and each group, in turn, has been subdivided into affiliated subgroups of specific occupations. The following table shows the relative importance of the major divisions within the Manufacturing and Mechanical category according to the figures for 1930:

Occupational Group	Percentage
Administrative and Service (including laborers)	33.4
Building Trades	16.4
Textiles and Clothing	12.8
Iron and Steel	12.6
Miscellaneous	8.4
Electrical Workers	3.3
Paper, Printing, and Allied	3.1
Food	2.8
Leather	2.5
Lumber and Furniture	2.5
Metals	2.2
Chemical and Allied	1.3
Clay, Glass, and Stone	0.9
Cigar and Tobacco	0.8
Total	100.0

The large size of the Administrative and Service group is due to the inclusion of all of those laborers who render unskilled or little-skilled service to manufacturing in general.

TABLE 50

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE
AND FEMALE, IN THE MANUFACTURING AND MECHANICAL
INDUSTRIES, 1870-1930

Occupational Group	1870	1880	1890	1900	1910	1920	1930
Administrative and Service	{ 1,123,722 82.4	2,008,446 38.1	2,243,104 31.8	3,151,216 34.8	3,411,746 32.5	4,146,963 33.2	4,547,909 33.4
Building Trades	{ 593,337 17.1	681,750 12.9	1,136,450 16.1	1,212,512 13.4	1,773,072 16.9	1,752,532 14.1	2,229,513 16.4
Electrical Workers .....	{ ..... .....	..... .....	..... .....	50,717 .6	156,459 1.5	303,316 2.4	451,524 3.3
Lumber and Furniture.....	{ 177,839 5.1	236,990 4.5	345,896 4.9	376,860 4.2	298,959 2.8	296,710 2.4	334,217 2.5
Clay, Glass, and Stone.....	{ 66,479 1.9	94,061 1.8	170,494 2.4	170,531 1.9	139,986 1.3	116,677 .9	122,498 .9
Iron and Steel.....	{ 330,623 9.5	458,664 8.7	690,268 9.8	905,793 10.0	1,272,615 12.1	2,015,849 16.2	1,721,433 12.6
Metals	{ 68,196 2.0	113,005 2.1	157,817 2.2	204,099 2.3	213,586 2.0	271,065 2.2	295,655 2.2
Leather	{ 236,717 6.8	268,291 5.1	304,087 4.3	298,726 3.3	323,379 3.1	358,090 2.9	343,906 2.5
Textiles and Clothing.....	{ 531,763 15.4	841,313 16.0	1,242,488 17.6	1,507,393 16.6	1,908,321 18.1	1,751,473 14.1	1,746,511 12.8
Paper, Printing, and Allied	{ 72,303 2.1	123,323 2.4	200,811 2.8	254,002 2.8	309,631 2.9	354,744 2.8	427,815 3.1
Food	{ 101,300 2.9	144,669 2.7	189,896 2.7	235,353 2.6	253,534 2.4	331,234 2.7	385,286 2.8
Cigar and Tobacco.....	{ 40,271 1.2	77,045 1.5	111,625 1.6	131,452 1.5	151,801 1.4	145,222 1.2	103,715 .8
Chemical and Allied.....	{ 17,936 .5	36,889 .7	60,921 .9	91,575 1.0	72,552 .7	157,768 1.3	178,730 1.3
Miscellaneous	{ 103,295 3.0	177,628 3.4	207,281 2.9	464,753 5.1	228,564 2.2	455,978 3.7	732,163 5.4
Total	{ 3,463,781 99.9	5,267,079 99.9	7,061,138 100.0	9,054,982 100.1	10,514,906 99.9	12,457,631 100.1	13,620,875 100.0

TABLE 51

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE
MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Occupational Group	1870	1880	1890	1900	1910	1920	1930
Administrative and Service	1,102,205 35.7	1,945,325 42.6	2,186,853 36.5	3,022,286 39.6	3,297,131 37.8	3,983,999 37.4	4,377,726 37.3
Building Trades	590,671 19.1	681,265 14.9	1,134,807 19.0	1,209,600 15.8	1,767,293 20.3	1,748,495 16.6	2,222,985 18.9
Electrical Workers .....	..... .....	..... .....	..... .....	50,808 .7	145,155 1.7	275,564 2.6	406,113 3.5
Lumber and Furniture.....	176,452 5.7	234,924 5.1	337,686 5.6	367,344 4.8	283,685 3.3	275,781 2.6	312,179 2.7
Clay, Glass, and Stone.....	66,120 2.1	92,840 2.0	166,593 2.8	164,349 2.2	130,430 1.5	103,420 1.0	106,726 .9
Iron and Steel.....	326,881 10.6	456,448 10.0	685,500 11.5	899,139 11.8	1,249,144 14.4	1,958,957 18.6	1,661,095 14.2
Metals	66,522 2.2	107,121 2.3	146,572 2.5	187,919 2.5	187,251 2.2	236,092 2.2	261,120 2.2
Leather	226,363 7.3	245,154 5.4	268,437 4.5	255,288 3.3	257,090 3.0	275,036 2.6	251,895 2.1
Textiles and Clothing.....	223,633 7.2	308,481 6.7	399,045 6.7	499,748 6.6	656,671 7.6	700,870 6.7	731,261 6.2
Paper, Printing, and Allied	61,934 2.0	105,429 2.3	154,733 2.6	195,210 2.6	233,758 2.7	273,609 2.6	352,769 3.0
Food	98,860 3.2	140,032 3.1	179,099 3.0	214,632 2.8	210,224 2.4	253,059 2.4	237,337 2.4
Cigar and Tobacco.....	36,137 1.2	66,177 1.4	83,634 1.4	87,955 1.2	79,956 .9	61,262 .6	35,767 .3
Chemical and Allied.....	15,485 .5	38,861 .7	52,056 .9	80,516 1.1	48,745 .6	119,787 1.1	139,423 1.2
Miscellaneous	96,804 3.1	156,810 3.4	185,042 3.1	387,356 5.1	150,041 1.7	311,897 3.0	588,265 5.0
Total	3,088,567 99.9	4,573,867 99.9	5,980,057 100.1	7,621,650 100.1	8,606,574 100.1	10,527,823 100.0	11,734,661 99.9

TABLE 52

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS IN
THE MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Occupational Group	1870	1880	1890	1900	1910	1920	1930
Administrative and Service	{ 21,517 5.7	63,121 9.1	56,251 5.2	128,930 9.0	114,615 6.3	212,964 11.0	179,183 9.0
Building Trades	{ 2,666 .7	485 .1	1,643 .2	2,912 .2	5,779 .3	4,037 .2	6,528 .3
Electrical Workers .....	{ .... ....	.... ....	.... ....	409 .029	11,904 .6	27,752 1.4	45,411 2.4
Lumber and Furniture.....	{ 1,387 .4	2,066 .3	8,210 .8	9,516 .7	15,274 .8	20,929 1.1	22,089 1.2
Clay, Glass, and Stone.....	{ 359 .1	1,221 .2	3,901 .4	6,182 .4	9,556 .5	13,257 .7	15,772 .8
Iron and Steel.....	{ 3,742 1.0	2,216 .3	4,768 .4	6,654 .5	23,471 1.3	56,892 2.9	60,338 3.2
Metals	{ 1,674 .4	5,884 .8	11,245 1.0	16,180 1.1	26,335 1.4	34,993 1.8	34,535 1.8
Leather	{ 9,854 2.6	23,137 3.3	35,650 3.3	43,438 3.0	66,289 3.6	83,054 4.3	92,011 4.9
Textiles and Clothing.....	{ 308,130 82.1	532,832 76.9	843,443 78.0	1,007,645 70.3	1,251,650 68.9	1,050,603 54.4	1,015,250 53.8
Paper, Printing, and Allied	{ 10,369 2.8	22,899 3.3	46,078 4.3	58,792 4.1	75,873 4.2	81,135 4.2	75,046 4.0
Food	{ 2,440 .7	4,637 .7	10,797 1.0	20,721 1.4	43,610 2.4	78,175 4.1	97,949 5.2
Cigar and Tobacco.....	{ 4,134 1.1	10,868 1.6	27,991 2.6	43,497 3.0	71,845 4.0	83,960 4.4	67,948 3.6
Chemical and Allied.....	{ 2,451 .7	3,028 .4	8,865 .8	11,059 .8	24,107 1.3	37,971 2.0	39,307 2.1
Miscellaneous	{ 6,491 1.7	20,818 3.0	22,239 2.1	77,397 5.4	78,523 4.3	144,081 7.5	143,898 7.6
Total	{ 375,214 100.0	693,212 100.0	1,061,061 100.1	1,433,332 99.9	1,818,231 99.9	1,929,803 100.0	1,886,214 99.9

TABLE 53

WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES: PERCENTAGE
OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population.....	8.983	10.501	11.276	11.915	11.433	11.785	11.094
All gainful workers, male and female.....	27.697	30.284	31.058	31.145	27.549	29.936	27.895
[Males of] All male gainful workers	28.947	31.020	31.773	32.086	28.900	31.840	30.818
[Females of] All female gainful workers	20.433	26.187	27.617	26.945	22.515	22.839	17.543

They are easily shifted from one factory to another and constitute a mobile body of general factory hands. In 1930 these laborers made up 70 per cent of the Administrative and Service group and 23 per cent of the entire Manufacturing and Mechanical category.¹

The groups following laborers in numerical importance are the Building Trades, Iron and Steel, and Textiles, comprising together 42 per cent of all workers in this occupational classification. No one of the remaining ten groups makes up as much as 6 per cent.

Importance of Occupational Groups

A single measure, such as numerical size, does not determine the economic or social significance of workers within a group. For example, it may be as Dr. Kreps has so well shown,² that a small body of less than 2,000 workers in the sulfuric acid industry is so important as to be indispensable in producing a commodity absolutely essential to manufacture and to modern civilization itself. Nevertheless, "number of workers" is a basic measure in any analysis of the gainfully employed, because it determines the relative sizes of groups.

How the groups in the Manufacturing and Mechanical classification, excluding the Administrative and Service group, have developed with respect to one another since 1870 may be seen in the tables above. Some have lost in relative importance; others have gained. But the significance of the Building Trades, the Iron and Steel, and the Textiles groups is indicated by the fact that even in 1870 they were the largest groups and together comprised 42 per cent of all manufacturing and mechanical pursuits.

Entirely new industries have developed during the past

¹ The *Fourteenth Census of the United States, 1920*, Vol. IV, "Population," p. 11, states that the revision of classification followed in the Fourteenth Census consisted mainly in an expansion of the "Thirteenth Census Report of Occupation Statistics": "The expansion consisted principally in showing separately the laborers and semi-skilled workers, respectively, for certain manufacturing industries for which they were not shown separately. . . . In addition, certain composite occupation groups shown at the Thirteenth Census were broken up into more elemental groups."

The *Twelfth Census of the United States, 1900*, Special Reports, "Occupations," p. xxvi, states: "In general it may be said that it was necessary to classify persons engaged in manufacturing and mechanical pursuits under general designations denoting the place of work or article produced, rather than under specific terms indicating the kind of work done, and that the proportion of indefiniteness in the returns of the groups of workers comprehending such general designations as makers, workers, employees, laborers, etc., ranges from one-fifth to one-half of the whole number of persons in each group."

² Theodore J. Kreps, *The Economics of the Sulfuric Acid Industry*, Stanford University Press, 1938, pp. 228 ff.

sixty years, and workers in these industries have entered mechanical and manufacturing pursuits to become an important part of this occupational classification. The Electrical group, some divisions of the Chemical, the Metals, and the Building groups (construction workers using cement and steel) are new entrants into the field. Other workers such as cigar makers, glass blowers, and hand-loom weavers, who formerly had numerical significance, have been displaced entirely or in major part by semiskilled machine-tenders.

Sex Composition of the Labor Force Used in Manufacturing and Mechanical Pursuits

The ratio of men engaged in manufacturing and mechanical industries to women in the same industries is as follows:

Census	Percentage	
	Males	Females
1870	89.2	10.8
1880	86.8	13.2
1890	84.7	15.3
1900	84.2	15.8
1910	82.7	17.3
1920	84.5	15.5
1930	86.2	13.8

Women have formed a minor portion of this category throughout the sixty-year period. They increased from 11 per cent in 1870 to a peak of 17 per cent in 1910 and declined in 1930 to within 3 per cent of their 1870 proportion. However, in actual numbers, the size of this female group declined in 1930 from the peak number of 1920, while a relatively greater number of males were employed in this year. It should be remembered that a large number of women entered this field of occupations during the decade of the World War.

Increase in Per-Worker Productivity (Table 54, Charts 15-19)

This chapter gives much evidence of the productivity increase per employed worker. Each section dealing with one of the many branches of manufacturing and mechanical industries reveals either an actual numerical displacement of workers as 1930 is approached or a slackening in the rate of growth of the labor force required. The statistical presentation, when coupled with the facts obtained from an analysis of present-day conditions in the industries, leads to the conclusion that

only a greatly expanded production will prevent most of the occupational groups, which have been increasing, from reaching a static condition.

What has occurred since 1920 with respect to the labor force in manufacturing and the output of factories is told in the study being made by the National Resources Committee of the government.³ The output of manufacturing increased 40 per cent from 1920 to 1929. The labor used in that increased production declined 2 per cent. The manufacturing industry, especially since the depression, has carefully scrutinized labor costs and stepped up the productivity of workers.⁴ Thus, with an output in 1934 only 5.6 per cent below that in 1920, the labor used in that production had declined 47 per cent below the 1920 requirement. These figures lead the authors to conclusions of extreme importance to prospective workers, vocational educators, and the public in general. The study says:

Why was there still a tremendous volume of unemployment in 1935, although most business indicators show that business was about as good during 1935 as during the prosperous years of 1923-25?

Many people have come to think of the middle 'twenties as "normal," and so have come to imply a return to that normal as the desired goal. This attitude overlooks the fact that a country like the United States, with its continuously increasing population, must regard "normal" as a process of ever-increasing levels of production, employment, and income. If labor productivity remained constant, the level of production would have to rise as fast as the labor supply in order to keep the volume of unemployment from increasing. Given our progressive technology, and the fact that, with increasing productivity, a decline in production results in a more than proportional decline in employment; and an increase in production results in a less than proportional increase in employment; we must contrive to increase the volume of production at a rate which is faster than the rate of increase of our labor supply or else we face the problem of an ever-increasing volume of unemployment.

In Table 54 the amount of production, number of workers employed, total number of man-hours they were employed, output per wage earner, and output per man-hour of employment are compared. The highly prosperous year 1929 is used as a base of 100.0, and comparisons made are to be read as

³ David Weintraub and Harold L. Posner, *Unemployment and Increasing Productivity*, WPA National Research Project, Report No. F-A, March 1937, pp. 35 ff.

⁴ Man-hour productivity is derived by dividing the total volume of production by the product of the average number of workers and the average number of hours worked. The measure is more exact than that of per-worker productivity because of variance in the number of hours worked by "employed persons." Output per man-hour in manufacturing is estimated to have increased 25 per cent from 1929 to 1934. (C. A. Bliss, *Production in Depression and Recovery*, National Bureau of Economic Research, Bulletin 58, November 15, 1935, p. 9.)

TABLE 54

PRODUCTION, EMPLOYMENT, AND PRODUCTIVITY IN 59 MANUFACTURING INDUSTRIES IN 1936* (1929=100)

Industry	Production	Employment	Man-Hours	Output per Wage Earner	Output Man-Hour
Agricultural implements	72.7	76.5	61.6	95.0	118.0
Beet sugar (1935)	115.2	....	90.7	....	127.0
Boots and shoes	111.1	97.2	80.1	114.3	138.7
Bread and bakery	96.0	112.4	93.2	85.4	103.0
Biscuits and crackers	101.1	89.3	....	113.2	....
Cane sugar refining	83.7	95.0	60.1	....	139.3
Canned and preserved fruits and vegetables	105.1	108.6	74.8	96.8	140.
Canned and cured fish (1935)	104.6	98.0	67.2	106.7	155.
Cement	66.4	68.4	51.6	97.1	128.
Chemicals	106.0	113.3	89.7	93.6	118.2
Clay products, other than pottery.....	54.1	60.0	55.1	90.2	98.2
Coke	74.0	101.9	77.5	72.6	98.6
Beehive coke	26.1	45.5	29.5	57.4	88.5
By-product coke	82.9	109.9	83.0	75.4	99.9
Confectionery	106.3	79.3	61.9	134.0	171.7
Cotton goods	95.6	92.0	72.1	103.9	132.6
Electric lamps (1931)	78.8	83.2	73.1	94.7	108.2
Fertilizers	76.0	77.5	62.2	98.1	122.2
Flour, etc.	86.1	95.7	85.3	90.0	100.9
Furniture	66.5	75.2	68.0	88.4	97.8
Glass (1935)	105.7	94.5	67.2	107.1	148.5
Window glass (1935)	84.5	80.5	....	121.0	....
Plate glass (1935)	110.8	54.6	....	202.9	....
Glass containers (1935)	118.4	113.2	....	104.6	....
Pressed and blown glass	95.6	100.6	....	95.0	....
Ice cream	99.0	78.5	67.4	126.1	146.9
Iron and steel	89.1	101.8	79.0	87.5	112.8
Blast furnaces	72.3	68.4	....	105.7	....
Steel works and rolling mills	90.0	103.9	....	86.8	....
Knit goods (1935)	111.0	105.4	76.4	105.3	145.3
Hosiery (1935)	110.0	106.5	....	103.3	....
Underwear (1935)	90.2	84.2	....	107.1	....
Outerwear (1935)	131.4	122.4	....	107.4	....
Knit cloth (1935) .....	....	136.6	....	....	....
Leather industry	109.4	103.	84.9	106.2	128.5
Sole and harness leather	110.5	107.	90.1	102.9	122.6
Side and upholstery leather	133.0	140.	112.5	94.5	118.2
Calfskin	91.1	57.3	54.7	159.0	166.5
Kid leather	91.8	96.7	74.6	94.9	123.1
Sheep and miscellaneous leather	104.2	90.6	74.9	115.0	139.1
Lumber and timber products	66.2	65.9	52.4	100.5	126.3
Logging camps	66.9	65.9	52.5	101.5	127.4
Sawmills and saw-plane mills	65.8	65.9	52.3	99.8	125.8

* Source: *Production, Employment, and Productivity in 59 Manufacturing Industries*, WPA National Research Project, Report No. S-1, Part Two, Washington, D.C., 1939.

TABLE 54 (Continued)

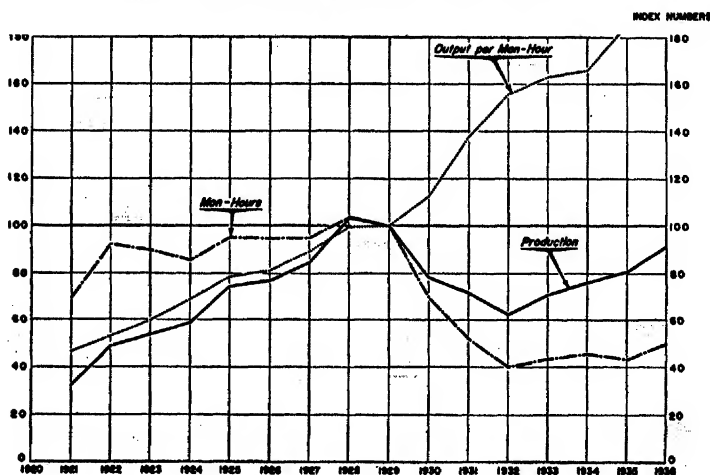
Industry	Production	Employment	Man-Hours	Output per Wage Earner	Output per Man-Hour
Manufactured ice	71.6	59.1	50.6	121.2	141.5
Motor vehicles	85.3	89.6	73.7	95.2	115.7
Newspaper and periodical printing and publishing	96.1	94.9	76.9	101.3	125.0
Nonferrous metals (1935)	54.1	78.0	62.4	69.4	86.5
Primary smelters and refineries (1935) ..	51.3	72.6	60.3	70.7	85.1
Secondary smelters and refineries (1935)	86.7	91.0	72.0	95.3	120.4
Allovers, rolling mills, and foundries (1935)	53.9	79.5	62.8	67.8	85.8
Paints and varnishes	97.2	98.9	80.0	98.3	121.5
Paper and pulp manufacturing	104.8	100.9	87.0	103.9	120.5
Paper manufacturing	102.0	101.8	86.6	100.2	117.8
Pulp manufacturing	119.4	97.1	88.6	123.0	134.8
Petroleum refining	108.9	97.3	68.9	111.9	158.1
Planing mill products (1935)	45.2	53.5	46.4	84.5	97.4
Rayon (1937)	281.5	148.3	116.6	189.8	241.4
Rubber products (1935)	78.4	77.0	55.8	101.8	140.3
Rubber tires and tubes (1935)	80.8	59.4	43.6	136.0	185.3
Other rubber goods (1935)	77.3	90.6	63.2	85.3	122.3
Silk and rayon goods (1935)	107.8	96.5	70.3	111.7	153.3
Slaughtering and meat packing	92.6	103.2	86.1	89.7	107.5
Tobacco products	87.0	77.7	58.3	112.0	148.7
Cigars	77.6	66.5	49.6	116.7	156.5
Cigarettes	129.8	114.1	95.2	113.8	136.3
Chewing and smoking tobacco	91.3	100.3	73.4	91.0	124.4
Woolen and worsted goods	111.4	103.1	78.8	108.1	141.0

percentages of that base, usually for the year 1936. Fifty-nine manufacturing industries, employing over 4,500,000 workers in 1929, are represented in the table. These were 51 per cent of all manufacturing workers. All but one of the sixteen industrial groups of the Census of Manufactures are represented in the table. The value of their product was 56 per cent of the total value of manufacture in that peak production year. The sample is therefore to be considered as representative of what is taking place in the manufacturing industry in general. It gives exact information for the particular industries represented in the table.

Even though the table is of great importance as a summary of the situation, and affords more than a glimpse of what is occurring with respect to technological advance, it must be remembered that the data are more than three years old. Many important technological changes affecting large numbers

CHART 15

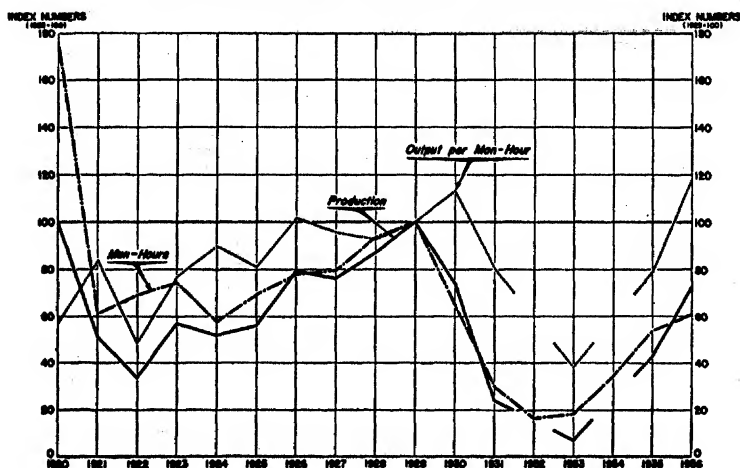
PRODUCTION, MAN-HOURS, AND OUTPUT PER MAN-HOUR IN RUBBER TIRES
AND TUBES MANUFACTURING, 1920-1936*



* Production, Employment, and Productivity in 59 Manufacturing Industries, Part II, WPA National Research Project, 1939.

CHART 16

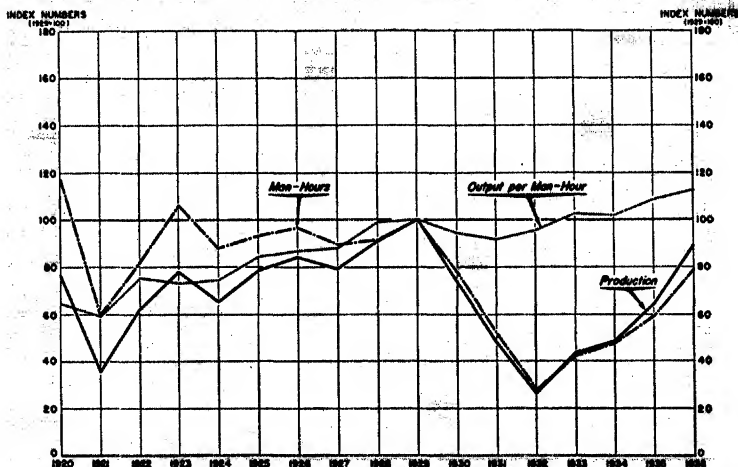
PRODUCTION, MAN-HOURS, AND OUTPUT PER MAN-HOUR IN AGRICULTURAL
IMPLEMENTS MANUFACTURING, 1920-1936*



* Production, Employment, and Productivity in 59 Manufacturing Industries, Part II, WPA National Research Project, 1939.

CHART 17

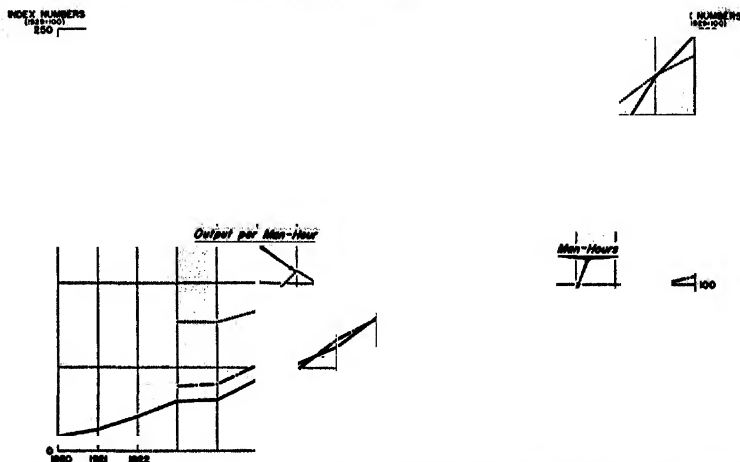
PRODUCTION, MAN-HOURS, AND OUTPUT PER MAN-HOUR, IRON AND STEEL GROUP, 1920-1936*



* Production, Employment, and Productivity in 59 Manufacturing Industries, Part II, WPA National Research Project, 1939.

CHART 18

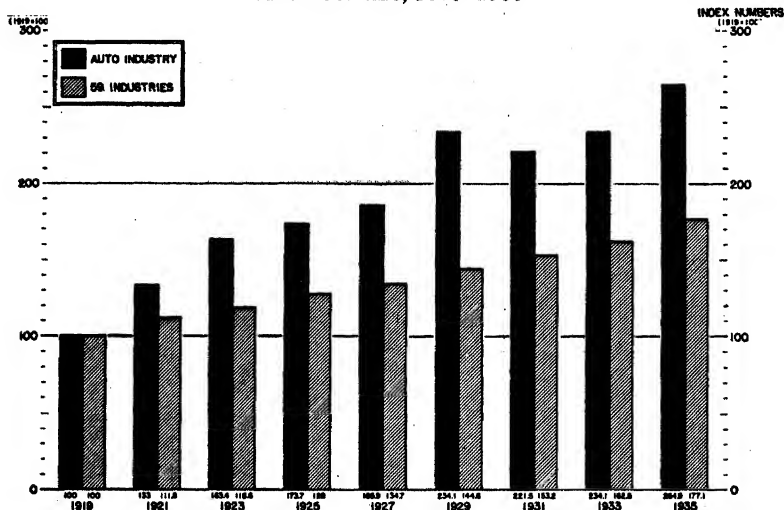
PRODUCTION, MAN-HOURS, AND OUTPUT PER MAN-HOUR, RAYON INDUSTRY, 1920-1936*



* Production, Employment, and Productivity in 59 Manufacturing Industries, Part II, WPA National Research Project, 1939.

CHART 19

MAN-HOUR PRODUCTIVITY IN THE AUTO INDUSTRY AND IN 59 MANUFACTURING INDUSTRIES, 1919-1935*



* *Production, Employment, and Productivity in 59 Manufacturing Industries, Part II, WPA National Research Project, 1939.*

of workers have occurred since then. For example, most significant changes have taken place in steel since 1937, indicated by the introduction of continuous rolling processes and other innovations. The result has been that steel production in September 1939 was only 1.3 per cent below the comparable month in 1937 but the number of workers employed in that production had declined 16.0 per cent below that required in the month of September two years earlier.⁵

The reader is urged to study the table carefully as it offers much information useful in explaining important trends in our economy. Some of the more striking facts are summarized under appropriate headings as follows:

Production

In the series, 67 industries, or branches of industries, are represented. Of that number, 23 showed appreciable gains in production in 1936 as compared with 1929; 3 maintained pro-

⁵ Research report of the Steel Workers Organizing Committee to the writers, checked with government authorities, Washington, D.C., November 1939.

duction at approximately the same levels; and 40 had curtailed production below 1929 levels. Production figures for the knit-cloth industry are not recorded. The largest production increase was experienced in the rayon industry, which in 1937 had an index of 281.5. The greatest loss in production was shown in beehive coke, which had declined in 1935 to 26.1 per cent of 1929.

When the products of the 66 industries or branches are divided into durable and nondurable categories, it appears that 18 are producing durable goods and 48 nondurable. Only one of the durable-goods industries showed an increase in output in 1936 over 1929, while 17 showed losses. Among nondurable-goods industries, on the other hand, 24 made gains in production, 3 remained stationary, and 22 experienced declines. Of the 10 food industries represented, 5 showed increases in production, one remained stationary, and 4 suffered actual declines. Of the 9 clothing industries recorded, 7 had increased production, while 2 had fallen off in 1936 in comparison with 1929. Some industries suffered loss of production due to partial displacement by others, such as manufactured ice which by 1936 had declined to 71.6 per cent of the 1929 output. For the most part, however, the drop in production can be attributed to loss in consumer demand, which was especially noticeable in the durable-goods and capital-goods industries.

Employment

The series of indices on employment records the average annual employment, as compiled from Bureau of Labor Statistics data. It is consequently not the total actual employment used in the production recorded in the table. It does represent, however, the best available data on average number of workers engaged in these several industries during the calendar year. Of the 67 industries and branches, 20 experienced increases in employment in 1936 as compared with 1929, 3 remained stationary, 43 suffered losses in number of workers, and production for one was not recorded.

Of the 15 large users of labor, each of whom employed more than 100,000 workers, and whose combined labor force was 36 per cent of all manufacturing workers in 1929, 6 had more workers in 1936 and 9 had fewer workers on their payrolls.

The latter represent 23 per cent of all who were employed in manufacture in 1929. When workers are distributed by the type of product made, it appears that in the durable-goods industries, which are the largest users of labor, only one increased employment from 1929 to 1936, while 4 employed fewer workers. Among the 10 large labor users making non-durable goods, 6 employed more workers, and 4 fewer workers.

Man-Hours

The series of man-hours gives information concerning the actual quantity of labor used in production. It does not indicate the number of workers employed, but gives the number of hours of employment in particular industries. It is consequently a very significant measure of employment. Of the 67 industrial units represented in the table, data on man-hours are available for 56, and only 2 of these—side and upholstery leather, and rayon manufacture—actually used more man-hours of employment in 1936 than in 1929. All of the others required fewer man-hours, some of them showing declines of 50 per cent or more.

Output per Wage Earner and per Man-Hour

Significant comparisons are made in the table between output per worker and per man-hour of employment. In 33 industries, the output per wage earner employed increased from 1929 to 1936, in 3 it remained practically stationary, and in 29 it actually declined. This is not a measure of technological efficiency or inefficiency, however, for it takes no account of working time involved in production. Consequently, what is being measured may be either an increase or a decrease in the number of hours of employment.

To measure technological change it is necessary to use the last series in the table, which shows production per man-hour of employment. In 46 of the 56 industrial units represented in the series, man-hour productivity increased from 1929 to 1936, in 4 it remained approximately stationary, and in 6 it actually declined. The increase in man-hour productivity ranged upward to a peak of 241.4 per cent in rayon manufacturing. Some of the gains made in the seven years under review have been startling. In 8 industries they exceeded 50 per cent, while in 22 others they ranged between 25 and 50 per cent.

Comparison Between Series

A helpful comparison can be made between the various series of indices given in the table. For example, the production of agricultural implements declined 27.3 per cent in 1936 as compared with 1929, the number of workers employed dropped 23.5 per cent, the actual number of man-hours worked declined 38.2 per cent; but the output per employed worker fell off only 4 per cent, and the actual production per man-hour increased 18 per cent. Under these conditions, the industry might have regained its 1929 production level and still used considerably fewer man-hours of labor than it did at that time. This does not necessarily require a correspondingly reduced labor force, for the alternative is fewer hours of employment per worker.

Beet-sugar production is an example of an expanding industry. In 1935 the quantity of beet sugar was 15.2 per cent more than in 1929. But this expanded production was achieved with 9.3 per cent fewer man-hours of labor than in 1929. It is not necessary to seek far for the reason for such conditions, for the technological efficiency of the labor force has so increased in the six years that the output per man-hour in 1935 was 27 per cent greater than in 1929.

Ice-cream manufacture is an example of an industry whose production was practically the same in 1929 as in 1936. Yet in the latter year it required 21.5 per cent fewer workers to make the same quantity of ice cream, and the man-hours they worked declined 32.6 per cent. The output per wage earner employed, however, increased 26.1 per cent, and on a man-hour basis this output had grown 46.9 per cent since 1929.

These facts must be considered in any analysis of occupational trends in manufacturing and mechanical pursuits. Occupations in this production field are particularly subject to technological advances which increase workers' productivity. The slackened rate of growth in the number of workers already noticeable in the census bodes little good when coupled with the technological changes now under way and in prospect, the enormously increased output of manufacture, and the relatively smaller increase in the wage bill of that manufacture. It is highly probable that if such conditions run their course unchecked by altered public policies such as the limitation of hours and the establishment of minimum wages, the inevitable

result will be an actual as well as a relative decline in the number of workers employed in manufacturing and mechanical pursuits. If this occurs, new workers developed by our expanding population will have to look elsewhere for employment opportunities.

It takes some time for the effects of technology and a more settled market to slacken the rate of growth of the labor force which seems to presage its actual decline. For example, events since 1930, such as the immediate shutdowns in the automobile trade to accommodate market fluctuations which are caused by the accumulation of thousands of used cars and the approach of a saturation point in new-car demand, indicate that even in this major field of industrial labor the maximum number of workers is being approached.

Given no appreciable increase and diffusion of purchasing power among the masses who now lack many needed or desirable commodities, it is possible that such examples will be multiplied in all manufacturing industries. The ultimate effect of this would be the slowing down of production and of the need for new workers, an effect already noted in textiles, and one which shows itself, so far as the labor force is concerned, either in replacing dislodged workers only (as in the glass industry), or in actually reducing the number of workers needed (as in the tobacco industry). Entirely new products which would appeal to the fancies or desires of certain people, and tap the surplus above living needs found in the incomes of spending units possessing over \$2,500 a year⁶ might conceivably alter this picture, as did the automobile industry in its

⁶ Maurice Leven *et al.*, *America's Capacity to Consume*, Brookings Institution, Washington, D.C., 1934, pp. 227, 228. The number of spending units, made up of both families and unattached individuals, in 1929 was 36,462,000, of whom 8,855,000, or 33.3 per cent, had incomes in excess of \$2,500 that year. The new industry would have to possess an unusually wide appeal, as did the automobile or the radio, to reach even this segment of all consumers. If it were in the luxury class, as is true of many new home inventions such as Monel-metal kitchen and bath fixtures, air conditioning, or television, it would probably have an even more restricted appeal. The number of spending units with incomes of \$5,000 or better at the peak of prosperity in 1929 totaled 2,543,000, or 6.9 per cent of all spending units in the United States. A very substantial proportion of these spenders would have to buy the new products, and their manufacture would have to require a very considerable man power, if new industries of a luxury character were to make the labor force in manufacture continue to grow. If new industries providing necessities are sought as the means of continuing industrial labor at an increasing rate of growth, then they must not only supplant others supplying some present needs but must add to present demands. The hope in this direction will be found in expanding purchasing power, for there is little possibility of an over-all increase in the number of industrial workers needed to provide manufactured output if one article is substituted for another already being manufactured. Technology has advanced to such a point that labor costs have become a major factor in all industrial production, and it is highly improbable that substituting industries could compete favorably with present industries if their labor requirements were appreciably greater.

beginning, and force a continuance in the increase of industrial workers.

Manufacturing and Mechanical Industries Relative to Population Growth

The net effect of this enormous increase in per-worker productivity explains in great part the statistical summaries which follow. In comparison with the development of the total population and the total gainfully employed, manufacturing and mechanical occupations have grown as shown in Table 55.

TABLE 55

PERCENTAGE INCREASE IN TOTAL POPULATION, TOTAL GAINFULLY EMPLOYED, AND TOTAL NUMBER OF WORKERS IN MANUFACTURING AND MECHANICAL PURSUITS, 1870-1930

Census	Total Population	Total Gainfully Employed	All Workers in Manufacturing and Mechanical Pursuits
1870 .....	.....	.....	.....
1880	30.1	39.1	52.1
1890	24.8	30.7	34.1
1900	21.3	27.9	28.2
1910	21.0	31.3	16.1
1920	14.9	9.0	18.5
1930	16.1	17.3	9.5
1930 over 1870.....	218.4	290.5	293.9

During the sixty years from 1870 to 1930, which encompassed the period of modern industrial development characterized by the shift from soil-tending to machine-tending, the total number of workers engaged in manufacturing and mechanical occupations just kept pace with the trend in development of the total labor force.

The Manufacturing and Mechanical category increased from 27 per cent of the total gainfully employed in 1870 to 31 per cent in 1900, but declined somewhat irregularly thereafter until in 1930 its percentage of the total labor force of the nation was almost as low as in 1870 and lower than that of any intervening census except 1910. Yet, the total labor force available for manufacturing and mechanical operations increased 294 per cent from 1870 to 1930, the decennial increase being larger prior to 1900 than thereafter. The period since the turn of the century, however, marks the time of greatest expansion in over-all production of our manufacturing enterprises. As Hurlin and Givens remark:

Notwithstanding the expansion of manufacturing in 1920, the rapid rate of increase in manufacturing employment during the four preceding decades appears to have fallen off somewhat from 1910 to 1920, and still more from 1920 to 1930.⁷

The Trend in Absolute Numbers

Especially since 1900 (when the accumulations of technology became particularly noticeable in factories) manufacturing and mechanical pursuits have not absorbed their proportion of the total available man power of the nation. The swollen demands artificially created for manufactured products during the World War served to arrest somewhat the downward trend, but the process of over-all displacement of manufacturing and mechanical workers and their movement into other parts of our economy reasserted itself, as evidenced by the figures on the proportion of the total gainfully employed in these pursuits in 1930.

It must be said immediately, however, in order to avoid confusion in the reader's mind, that the actual number of manufacturing and mechanical workers was greater in 1930 than in any previous census year. The gain of 1,185,091 workers from 1920 to 1930 was largely the result of additions confined to general laborers who serve all branches of industry—the Building Trades, the Electrical, and the Miscellaneous groups of workers. The other subgroups within Manufacturing and Mechanical Industries either showed small gains or actual losses, despite the greatly increased production in these industries. A detailed discussion of these trends is given in this chapter under the appropriate occupational headings.

However, from 1870 to 1900, during the early development of our modern, large-scale industrial economy, 5,591,201 new workers were added to the labor force engaged in manufacturing and mechanical pursuits, whereas from 1900 to 1930, during the period of revolutionary transformation of this economy and its emergence to the place of dominance in our national life, only 4,587,740 new workers were added to the manufacturing and mechanical group. The rate of gain in number of such workers dropped, between 1920 and 1930, to less than that at any ten-year period recorded since 1870. For estimated figures for 1940 see Table 4, page 16, and Table 7, page 21.

Barring some radical change in economic life, such as a

⁷ Ralph G. Hurlin and Merideth B. Givens, *Recent Social Trends in the United States*, McGraw-Hill Company, New York, 1933, p. 284.

very sharp reduction in the working time of employed persons, a vast new industry, or a very much enlarged effective demand shown in either foreign or domestic purchasing power, it is manifest that this matured manufacturing industry, with its present complement of qualified workers and its use of technological labor-saving equipment, will not continue to absorb its quota of those adults in our population who require and seek gainful employment. The numerical decrease in additions of new workers, which began with the enormous increase in productivity evidenced at the turn of the century, was momentarily halted by the war-time demands. But even the great prosperity of the late 1920's could not stay the course of the general declining trend.

Industrial Classification

The census has made an industrial classification for two decades, 1910 and 1930. In these collections of figures are gathered all persons who, regardless of the particular kind of service they render, are occupationally related to manufacture. This permits comparisons of the total man power available for manufacture. The figures are found in Table 56.

The years from 1910 to 1930 marked an era of unusual industrial development in the United States, including the phenomenal changes wrought in manufacture to expand plant, equipment, and output to meet war-time demands, and to enlarge still further many parts of the industry to meet the prosperity of the 1920's. These many factors combined to create an industrial labor force of factory and office workers in manufacture which engaged 3,506,149 more persons in 1930 than twenty years earlier, a gain of 32 per cent. Judged only in terms of workers, these figures are encouraging because they indicate an over-all expansion which required more employable persons.

But this is only part of the picture, which must be enlarged to include figures on population increase and amount of production, if the ability of manufacture to absorb its proportionate share of all available or potential workers is to be determined. The population of gainful workers sixteen years of age and over increased 33 per cent from 1910 to 1930, so that the population increased more rapidly than the labor force available in manufacturing.

TABLE 56

NUMBER AND PERCENTAGE DISTRIBUTION OF WORKERS IN MANUFACTURING INDUSTRIES, WITH PERCENTAGE CHANGES, 1910-1930

Industry	1910 ^a		1930 ^b		Percent- age Change 1930 over 1910
	Number	Percent- age	Number	Percent- age	
Building Trades	3,410,819	31.38	2,574,968	17.95	- 24.5
Chemical and Allied	122,132	1.12	621,986	4.34	+409.3
Cigar and Tobacco	195,370	1.80	149,563	1.04	- 23.4
Clay, Glass, and Stone	368,394	3.34	371,961	2.59	+ 2.4
Electrical	157,973	1.45	672,825	4.69	+325.9
Food ^c	535,314	4.92	907,253	6.33	+ 69.5
Iron and Steel	1,548,076	14.24	3,283,203	22.89	+112.1
Metals ^d	290,777	2.67	332,976	2.32	+ 14.5
Leather	339,974	3.13	374,069	2.61	+ 10.0
Lumber and Furniture	797,994	7.34	863,026	6.02	+ 8.1
Paper, Printing, and Allied...	488,680	4.50	787,995	5.49	+ 61.2
Textiles and Clothing	1,578,316	14.52	1,973,275	13.76	+ 25.0
Miscellaneous	1,041,404	9.58	1,428,272	9.96	+ 37.1
Total	10,875,223	99.99	14,341,372	99.99	+ 31.9

^a Data for 1910 were secured from grouping information contained in the *Thirteenth Census of the United States, 1910*, IV, 312 ff., having been computed on the basis of the *Fifteenth Census of the United States, 1930* display.

^b The 1930 data were taken from the *Fifteenth Census of the United States, 1930*, V, 408.

^c Food Industries includes liquor and beverages.

^d Metals Industries includes all metals except iron and steel.

In comparing all workers used by manufacturing industries (including the clerical as well as the industrial workers) with the occupational groups engaged in manufacturing and mechanical pursuits, the following figures are obtained:

Group	1910	1930	Percent- age Gain
All workers in manufacturing industries including office workers.....	10,875,222	14,341,372	32.0
Workers in manufacturing and mechanical occupations	10,514,805	13,642,722	30.0
Difference	360,417	698,650	

While both the total number of workers in manufacturing and the total number engaged in the manufacturing and mechanical pursuits have increased, the excess of workers in 1930 over 1910 indicates that proportionately more subsidiary workers are being used by manufacturing industries than by manufacturing and mechanical pursuits. The gain in all

workers in manufacturing industries in the twenty years was 32 per cent whereas manufacturing and mechanical workers increased only 30 per cent.

Use of the Labor Force in Manufacturing and Mechanical Pursuits

How the labor force in Manufacturing and Mechanical Industries has been used may be seen in part from the data collected in Table 57.

TABLE 57

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF CORPORATIONS AND OF SINGLE UNITS, NUMBER OF PROPRIETORS AND FIRM MEMBERS, SALARIED OFFICERS, AND WAGE EARNERS, 1899-1929*

		1919		Change, 1929 over
Number of establishments ..	175,142	214,383	210,959	
Percentage change		+22.4	-1.6	
Number of corporations		21,464	26,268	
Percentage change			+22.4	
Number of single units			184,673	
Proprietors and firm members		273,265	250,571	132,210
Percentage change .....		....	- 8.3	-46.8
Salaried officers	364,120	790,276	1,438,219	1,358,775
Percentage change		+117.0	+82.0	- 5.6
Average wage earners employed	4,712,763	6,472,616	9,000,059	8,838,743
Percentage change		+ 37.3	+39.0	- 1.8
				+ 87.5

* *Census of Manufactures, 1929*, United States Department of Commerce, Bureau of the Census, I, 16. For figures for later years see *Census of Manufactures, 1933, 1935, 1937*, chap. 2.

Certain trends are apparent. The numbers of manufacturing establishments, salaried officials, and wage earners mounted from 1899 to 1919, and fell in 1929. The number of proprietors and firm members declined from 1909 to 1929, while the number of salaried officials mounted until 1919 and dropped only slightly in 1929, suggesting that independent businesses were becoming less important in comparison with corporation-manager establishments. The number of wage earners employed increased only 36 per cent from 1909 to 1929, while the value added by manufacture increased 280 per cent. During this time the volume of production increased 238 per cent.^a A

^a *Statistical Abstract of the United States, 1937*, p. 738.

third more workers produced this enormously increased output.

The percentage that wages and salaries were of the total value added by manufacture appears as follows:

	1899	1909	1919	1929
Wages	41.6	40.9	42.2	36.3
Salaries	7.9	11.3	11.6	11.3
Total	49.5	52.2	53.8	47.6

It is apparent that workers engaged in manufacture received proportionately less of the value added by manufacture in 1929 than at any previous census since 1899. Wage earners have suffered particularly, while the proportion of the total value added by manufacture received by salaried personnel has held fairly constant since 1909. Such facts present only a partial picture, however, for they do not tell what occurred to the average worker. For this purpose it is necessary to offer figures on "per-worker income" as related to the value added by manufacture, as follows:

TABLE 58

COMPARISON OF THE VALUE ADDED BY MANUFACTURE WITH WAGES AND WITH SALARIES ON A PER-WORKER BASIS IN THE MANUFACTURING INDUSTRIES, 1899-1929*

		1919	1929	Increase, 1929 over	
Value added by manufacture per wage worker	\$1,025	\$1,296	\$2,758	\$3,608	\$2,783
Percentage increase		26.4	112.8	30.8	252.0
Wages per wage worker	\$ 426	\$ 529	\$1,163	\$1,314	\$ 888
Percentage increase .....	....	24.2	119.7	13.0	208.3
Value added by manufacture per salaried worker	\$1,327	\$1,061	\$1,725	\$2,347	\$1,020
Percentage increase		-20.1	62.5	35.9	76.7
Salary per salaried worker	\$1,045	\$1,187	\$2,002	\$2,647	\$1,602
Percentage increase .....	....	13.6	68.6	32.2	153.2
Value added by manufacture per employed person	\$ 951	\$1,154	\$2,378	\$3,127	\$2,176
Percentage increase .....	....	21.4	106.0	31.5	228.9
Total wages and salary per employed person	\$ 471	\$ 601	\$1,278	\$1,492	\$1,021
Percentage increase		27.6	112.8	16.7	216.8

Computed.

When displayed on a per-worker basis the value added by manufacture reveals an irregular trend, as does the working income per employed person. But the former increased 229 per cent from 1899 to 1929 while the latter gained only 217 per cent. In the most prosperous decade, from 1919 to 1929, the value added by manufacture increased at a rate almost twice that of the increase in payment per person engaged in the expanded production.

Wage earners, particularly, have fared badly. Their average annual wage in 1929 was \$1,314, which represented a gain of only 13 per cent from 1919. Salaried workers, whose 1929 income was \$2,647, gained 32 per cent in earnings in comparison with 1919.

The figures on plural and single units warrant special mention. Plural units are those which have central administrative headquarters with more than one factory or manufacturing establishment under their full control. They are mostly the larger corporations. Single units are individuals, or partnerships having a single establishment. The number of plural units increased rapidly until in 1929 they constituted 12 per cent of all manufacturing establishments.⁹ But their true significance is not found in such a figure, for they are so large that they employed 48 per cent of the workers engaged in manufacturing in 1929, and produced 54 per cent of all goods. In that year, the smaller manufacturing plants, the single units, constituted 87 per cent of all establishments, employed 51 per cent of all workers, but produced only 45 per cent of all manufactured goods.

The number of manufacturing establishments reached a peak during the World War, when they were increased to meet the enormously swollen demands of the war-time economy. Such a development was made possible by events taking place during the preceding fifty years. A large supply of workers had been created as a result of birth and immigration, the latter representing the greatest mass migration of people ever recorded in history. Agriculture had reached its zenith and much of its appeal to resourceless men had ceased with the settlement of free land. The cityward movement was well under way. Steam and electric power had been developed to enlarge greatly the area suitable for manufacture as compared

⁹ *Fifteenth Census of Manufacture, 1929, I, 95.*

with the period of water-driven wheels. The mineral resources of the country had been discovered and brought to commercial use, and the chemical laboratories had rendered essential service to industry. Labor-saving machinery had been invented and practical tools had been made. Man's ingenuity had enlarged the scope of manufacture and extended the requirements of civilization. The age of iron and steel was upon us in earnest. The accumulation of capital had proceeded to a point where surplus savings were available for extended investments; the corporate form of enterprise and the methods of stock issues had made remote control of manufacture and the capitalization of enterprise possible all over the United States. The government had favored such activity by a policy of enormous subsidies to industry through protective tariffs and a system of taxation which permitted the concentration of wealth and the accumulations of large capital gains.

Into this setting came the World War with its fabulous prices and its limitless foreign markets. Small wonder that the industrial economy of the nation grew to giant size almost overnight. This development put the finishing touches to an economy which had forged ahead to its present maturity from the days of weakness, small stature, and limited range of action in the immediate post-Civil War period.

Only a greatly expanded domestic market demand could maintain this structure when the World War ended. It was not found immediately, and a sharp depression resulted in 1921-1923. This was followed by a great expansion, creating the largest domestic market and the greatest production era in American economic life—the prosperity of the later 1920's. But this expansion in our economy was accomplished as the aftermath of a war-time development which had seen the supplanting of many men by women working for less pay, the use of labor-saving machinery on all industrial fronts, the reckless speculation of savings which normally flowed into plant expansions, and an increasing "storage" of labor while business gains were being made at the expense of the employed labor force and the labor fund. The inevitable result was the collapse of 1930.

Willard I. Thorp assembled the figures on plural and single units for 1919,¹⁰ disregarding financial combinations, inter-

¹⁰ Willard I. Thorp, *The Integration of Industrial Operation*, Census Monographs, United States Department of Commerce, Bureau of the Census, 1924, III, 17.

locking directorates, bank control, and all other forms of plurality except actual physical operating combinations. His figures also included all establishments engaged in manufacture, whereas those quoted for 1929 in Table 57 exclude factories whose annual output is valued at less than \$5,000. Thorp found that 21,464 units, or 7.4 per cent of all manufacturing establishments, were of the plural type. By 1929 corporation control had advanced to include almost all plural units and a very substantial part of the single units, the figures¹¹ being as follows:

Character	Percentage of Establishments	
	Plural Units	Single Units
Corporate	11.6	36.7
Noncorporate	0.8	50.9

Distribution of Workers among Units

Of equal significance are data on the distribution of number of workers in manufacturing establishments. Table 59 gives some pertinent information:

TABLE 59
PERCENTAGE DISTRIBUTION OF NUMBER OF WORKERS PER PLANT IN ALL
MANUFACTURING INDUSTRIES, 1909-1929*

Number of Wage Earners per Plant	Percentage Distribution in All Plants		
	1909	1919	1929
1 to 5.....	4.7	2.7	3.2
6 to 20	9.7	6.8	6.7
21 to 50.....	11.6	9.1	9.2
51 to 100.....	11.8	9.8	10.1
101 to 250.....	19.0	17.6	18.0
251 to 500.....	15.2	13.9	15.1
501 to 1,000.....	12.7	13.4	13.3
1,001 and over.....	15.3	26.7	24.4
Totals	100.0	100.0	100.0

* *Big Business, Its Growth and Its Place*, pp. 38 ff.

Here again figures for 1909 are not entirely comparable with those for 1919 and 1929, for they include all manufacturing establishments, while those of the two latter years exclude plants whose gross earnings are less than \$5,000 annually. However, as was determined in the study from which these figures are taken, the inclusion or exclusion of such manufac-

¹¹ *Big Business, Its Growth and Its Place*, Corporation Survey Committee, Twentieth Century Fund, Inc., New York, 1937, pp. 35-36.

turing plants throws the column of figures out of line only by small percentages and any figure in the column only a fraction of one per cent. While there are a number of plants so small as to gross less than \$5,000, they do not employ a substantial aggregate number of workers.

Relatively few workers in manufacturing establishments are employed by firms having less than twenty employees. In fact, by 1929 less than 10 per cent were in such plants. At the other extreme, plants having more than 500 workers employed 37 per cent of all manufacturing workers. Table 59 would suggest that industrial development has reached a point where the more typical manufacturing plant is one having from 250 to 1,000 workers, and that such large establishments have increased their proportion of all employed workers since 1909.

The gigantic plants with more than 1,000 workers have declined slightly from their peak in 1919 in the proportion they employ of all workers, but such plants are still greatly in excess of what they were in 1909. Two factors may be at work to effect this change: the tendency toward an ultimate profitable organization of technology within single units which limits the number of workers to be employed under a single roof; and the fact that curtailment of war-time market demands following 1919 probably tended to reduce the number of workers employed in the largest plants more than in smaller units. The shipyards are an example cited by the Twentieth Century Fund study in this connection.

Distribution of Wage Earners by Establishments

Another portrayal of the character of manufacturing plants and their use of the labor force is made in Table 60. The *Census of Manufactures* for 1933 has been drawn upon to present data for 84 of the 308 industries included in the census. The Census Bureau compiled the data on these 84 industries for the Twentieth Century Fund, from whom the present writers have secured the material. These data permit grouping of establishments under the same ownership and the display of the number of workers engaged in such establishments. Thus, for 84 industries, which include 3,534,836 wage earners, or 58 per cent of all wage earners in manufacturing, the table shows what proportion are working for the six largest concerns.

TABLE 60

A SAMPLE OF ALL MANUFACTURING INDUSTRIES COMPRISING 84 OF THE 308 INDUSTRIES—32,445 MANUFACTURING CONCERNS EMPLOYING 3,534,836 WAGE EARNERS—IN 1933*

Industry	Number of Concerns	Average Number of Wage Earners	Six Largest Concerns	
			Percent-age of All Concerns	Percent-age of Wage Earners
Agricultural implements	145	11,140	4.1	70.8
Aircraft	60	7,816	10.0	79.3
Aluminum products	95	13,634	6.3	76.7
Asbestos packing products	164	10,659	3.7	56.5
Asphalted, felt-base, floor covering, etc. .	12	5,092	50.0	92.1
Bolts, nuts, washers, and rivets	92	8,486	6.5	59.2
Boots and shoes	1,014	190,914	.6	26.0
Boxes, paper	1,014	47,220	.6	11.6
Canned and dried fruits and vegetables, etc.	1,656	84,274	.4	19.4
Carpets and rugs, wool.....	50	21,296	12.0	64.5
Cars, electric and steam railroad.....	43	14,266	14.0	70.1
Cash registers, etc.	35	10,908	17.1	84.9
Cast-iron pipe fittings	50	9,454	12.0	49.7
Cement	78	15,829	7.7	42.6
Chemicals	341	53,190	1.8	44.4
Cigarettes	19	22,544	31.6	99.4
Cigars	619	54,558	1.0	36.2
Clay products, etc.	762	31,944	.8	22.0
Clocks, etc.	52	12,850	11.5	67.2
Clothing, men's, youths', and boys'	2,151	19,253	.3	12.0
Clothing, women's	5,240	159,832	.1	3.7
Coke-oven products	67	13,066	9.0	53.2
Collars, men's	9	1,213	66.7	....
Confectionery	1,181	50,609	.5	18.5
Cordage and twine	100	11,145	6.0	37.4
Corn syrup, etc.	21	7,591	28.6	90.4
Cotton goods	785	379,445	.7	12.4
Dyeing and finishing textiles	578	66,309	1.0	19.9
Electrical machinery, etc.	1,040	130,857	.6	47.4
Engines, etc.	170	23,535	3.5	45.7
Explosives	28	4,168	21.4	87.4
Fertilizers	312	13,063	1.9	40.1
Firearms	21	3,382	28.6	86.8
Forgings, iron and steel	169	7,953	3.6	26.1
Furniture	2,250	105,488	.3	8.2
Glass	159	49,797	3.8	44.1
Hardware	367	32,550	1.6	40.4
Hats, fur-felt	114	12,540	5.3	54.0
Leather, tanned, curried, and finished...	311	44,191	1.9	25.9
Liquors, distilled and ethyl alcohol.....	35	2,514	17.1	68.2
Machine tools	229	12,714	2.6	29.7

* Special report compiled for this text by the Committee of the Twentieth Century Fund.

TABLE 60 (Continued)

Industry	Number of Concerns	Average Number of Wage Earners	Six Largest Concerns	
			Percentage of All Concerns	Percentage of Wage Earners
Matches	11	4,726	54.5	86.9
Meat packing, wholesale	949	113,193	.6	56.1
Meters, etc.	56	3,156	10.7	62.4
Motion pictures	82	10,777	7.3	79.4
Motorcycles, etc.	17	3,038	35.3	80.2
Motor-vehicle bodies	632	145,745	.9	67.2
Motor vehicles	84	97,869	7.1	78.4
Musical instruments: pianos	36	2,700	16.7	63.8
Paper	445	87,224	1.3	16.5
Pencils, lead	24	3,469	25.0	71.5
Petroleum refining	216	69,047	2.8	52.7
Photographic apparatus, etc.	77	8,975	7.8	88.7
Planing-mill products	2,274	35,388	.3	7.1
Plumbers' supplies	224	15,893	2.7	35.9
Pottery	216	23,632	2.8	25.5
Pulp	124	20,074	4.8	34.5
Radio apparatus and phonographs	150	32,879	4.0	58.2
Rayon, etc.	21	44,306	28.6	84.9
Refrigerators, etc.	191	26,398	3.1	63.9
Rubber goods	331	35,205	1.8	26.6
Rubber tires and inner tubes	36	52,976	16.7	77.9
Sewing machines	28	6,313	21.4	90.4
Ship and boat building	368	30,855	1.6	54.2
Shirts	457	53,816	1.3	25.7
Silk and rayon goods	895	110,322	.7	13.9
Smelting and refining: copper	11	5,596	54.5	90.5
Smelting and refining: lead	7	2,105	85.7	....
Smelting and refining: zinc	19	6,866	31.6	70.2
Soap	212	14,304	2.8	70.6
Stamped ware, etc.	540	32,302	1.1	16.3
Steam and hot-water heating apparatus ..	198	22,301	3.0	52.5
Steel works and rolling-mill products	254	276,847	2.4	57.5
Stoves, etc.	528	30,193	1.1	20.4
Sugar-beets	23	10,706	26.1	80.1
Sugar refining, cane	13	11,495	46.2	77.5
Textile machinery	302	18,576	2.0	47.9
Tin cans, etc.	116	23,343	5.2	71.4
Typewriters	8	9,591	75.0	....
Washing machines, etc.	39	6,956	15.4	68.3
Watchcases	20	1,168	30.0	86.0
Wire drawn from purchased rods	65	14,656	9.2	52.6
Woolen goods	309	48,536	1.9	25.2
Worsted goods	186	78,691	3.2	38.4
Wrought pipe, welded and heavy-riveted...	37	6,552	16.2	71.4

Of the 32,445 manufacturing concerns listed, the 512 largest, or 1.6 per cent of the total, employed 38.4 per cent of all wage earners, an average of 2,579 workers per unit. The remaining 98.4 per cent of all manufacturing concerns employed 61.6 per cent of all workers, an average of 69 wage earners apiece. Such general figures obviously conceal more than they reveal, and the reader is urged to study the tabulated material on each industry separately to determine the degree of concentration which has taken place there.

These data are of immediate significance for vocational guidance, occupational training, and the adjustment of workers. They indicate that industries, while varying considerably in the amount of concentration of control which has been established, are all confronted with this problem: workers in many industries become small cogs in great machines. These machines are impersonal; they are a part of the productive system of our economy itself.

In view of these conditions, a satisfactory labor policy is not likely to be established in terms of individual workers. Relations will be more affected by the degree of monopoly present in the industry, by the technological advance which is possible, the amount and character of labor organization, the effective demand for the products of the industry, and public policy respecting the industry. With all these factors the welfare of this vast army of industrial workers, the largest single group of gainfully employed within our national economy, is intimately interwoven. These are the larger, more comprehensive aspects of vocational guidance and training with which our educational and welfare institutions should be more vitally concerned.

A. ADMINISTRATIVE AND SERVICE GROUP

General Characteristics (Tables 61 and 62, Chart 10)

Manufacturers and Managers, Foremen and Overseers, Stationary Engineers and Firemen, Oilers of Machinery, and unclassified Laborers are listed in this division. This classification segregates from the various types of mechanical and manufacturing activities, those occupations which are common

160 MANUFACTURING AND MECHANICAL INDUSTRIES

TABLE 61

NUMBER AND PERCENTAGE DISTRIBUTION OF GAINFUL WORKERS IN THE
ADMINISTRATIVE AND SERVICE GROUP OF MANUFACTURING AND
MECHANICAL INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
MALE AND FEMALE							
Manufacturers and Managers	{ 57,405 5.1	69,595 3.5	153,882 6.9	243,009 7.7	361,312 10.6	433,645 10.5	520,657 11.4
Foremen and Overseers ....	{ .... ....	.... ....	36,084 1.6	55,450 1.8	175,997 5.2	308,137 7.4	338,504 7.4
Engineers and Firemen (except locomotive and fire-department)	{ 34,233 3.0	79,623 4.0	139,765 6.2	223,495 7.1	342,239 10.0	423,859 10.2	444,258 9.8
Oilers of Machinery .....	{ .... ....	.... ....	.... ....	.... ....	14,013 .4	24,612 .6	31,210 .7
Laborers	{ 1,032,084 91.8	1,859,223 92.6	1,913,373 85.3	2,629,262 83.4	2,518,135 73.8	2,956,710 71.3	3,213,280 70.7
Total	{ 1,123,722 99.9	2,008,446 100.1	2,243,104 100.0	3,151,216 100.0	3,411,746 100.0	4,146,963 100.0	4,547,900 100.0
MALE							
Manufacturers and Managers	{ 57,209 5.2	69,122 3.6	153,468 7.0	239,649 7.9	355,143 10.8	420,369 10.7	504,524 11.5
Foremen and Overseers ....	{ .... ....	.... ....	35,109 1.6	54,032 1.8	156,256 4.7	277,966 7.1	310,037 7.1
Engineers and Firemen (except locomotive and fire-department)	{ 34,233 3.1	79,623 4.1	139,718 6.4	223,318 7.4	342,279 10.4	423,802 10.8	444,235 10.1
Oilers of Machinery .....	{ .... ....	.... ....	.... ....	.... ....	13,990 .4	24,568 .6	31,169 .7
Laborers	{ 1,010,763 91.7	1,796,575 92.4	1,858,558 85.0	2,505,287 82.9	2,429,458 73.7	2,787,294 70.9	3,087,761 70.5
Total	{ 1,102,205 100.0	1,945,325 100.1	2,186,858 100.0	3,022,236 100.0	3,297,131 100.0	3,983,999 100.1	4,377,726 99.9
FEMALE							
Manufacturers and Managers	{ 196 .9	473 .7	414 .7	3,360 2.6	6,164 5.4	13,276 6.2	16,133 9.5
Foremen and Overseers ....	{ .... ....	.... ....	975 1.7	1,418 1.1	19,741 17.2	30,171 14.2	28,467 16.7
Engineers and Firemen (except locomotive and fire-department) .....	{ .... ....	.... ....	47 .1	177 .1	10	57	23
Oilers of Machinery .....	{ .... ....	.... ....	.... ....	.... ....	23 23	44 44	41 41
Laborers	{ 21,321 99.1	62,648 99.3	54,815 97.4	123,975 96.2	88,677 77.4	169,416 79.6	125,519 73.8
Total	{ 21,517 100.0	63,121 100.0	56,251 99.9	128,930 100.0	114,615 100.0	212,964 100.0	170,183 100.0

TABLE 62

WORKERS IN THE ADMINISTRATIVE AND SERVICE GROUP: PERCENTAGE OF
TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS
IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	2.914	4.004	3.581	4.147	3.710	3.923	3.704
All gainful workers, male and female	8.986	11.548	9.866	10.840	8.940	9.965	9.313
All in Manufacturing and Mechanical In- dustries	32.400	38.100	31.800	34.800	32.400	33.300	33.400
[Males of]							
All male gainful workers	10.330	13.193	11.619	12.723	10.957	11.898	11.497
All males in Manu- facturing and Mechani- cal Industries	35.700	42.600	36.500	39.600	37.800	37.400	37.300
[Females of]							
All female gainful workers	1.170	2.380	1.430	2.430	1.410	2.490	1.580
All females in Manu- facturing and Me- chanical Industries	5.700	9.100	5.200	9.000	6.300	11.000	9.000

to all these industries generally and those which service manufacturing and mechanical operations. While many of these occupations have become closely identified with particular industries and cannot be readily shifted to others, the greater number are of a character that can be used in any industry in the Manufacturing and Mechanical category.

This Administrative and Service group forms a major part of all occupations engaged in manufacturing and mechanical pursuits, comprising a third of that group in each decade since 1870. It grew from 1,123,722 in 1870 to 4,547,909 in 1930. Throughout that sixty years it has constituted an important part of the total labor force, ranging from 9 to 11 per cent of that body. It fluctuated somewhat from decade to decade in comparison with the total gainfully employed, as shown in Table 50; the general trend since 1880 is slightly downward, indicating that despite its actual numerical increase in successive decades this important group did not maintain its position in the growth of the total labor force of the nation.

The sex composition of the Administrative and Service group may be summarized thus:

Census	Percentage	
	Males	Females
1870	98.1	1.9
1880	96.9	3.1
1890	97.5	2.5
1900	95.9	4.1
1910	96.6	3.4
1920	94.9	5.1
1930	96.3	3.7

It is apparent that the type of work represented in these occupations is almost exclusively masculine and that women have made no great movement into it during the sixty-year period. Of the total number of females listed under Manufacturing and Mechanical Industries, it appears that in 1930 there were 9 per cent engaged in administrative and service occupations, comprising less than 2 per cent of the total female labor force in the nation. The trend since 1870 does not indicate any marked alteration in this percentage in the future.

For both male and female workers it is evident that unclassified laborers constitute the numerically important part of the Administrative and Service group, comprising over 70 per cent of the group in 1930. Female engineers and firemen are almost nonexistent; but forewomen and female overseers make up 16 per cent of the female contingent as compared with 7 per cent of such males in the Male group. The proportions of each sex among Manufacturers and Managers is about equal.

Manufacturers and Managers

Since the census has combined these two occupations, it is impossible to distinguish for all decades since 1870 the trend of independent proprietary occupations from that of managerial occupations in which workers conduct business enterprises for absentee owners. The 1910-1930 censuses list the two groups separately as indicated in Table 63.

TABLE 63
COMPARISON OF MANUFACTURERS WITH MANAGERS AND OFFICIALS,
1910-1930

Census	Manufacturers		Managers and Officials	
	Number	Percentage	Number	Percentage
1910	235,618	65.5	125,694	34.5
1920	183,695	42.3	249,950	57.7
1930	207,901	39.9	312,756	60.1

TABLE 64

**MANUFACTURERS AND MANAGERS: PERCENTAGE OF ALL GAINFUL WORKERS
AND OF ALL WORKERS IN MANUFACTURING AND
MECHANICAL INDUSTRIES, 1870-1930**

Base	1870	1880	1890	1900	1910	1920	1930
All gainful workers, male and female.....	.459	.400	.677	.836	.947	1.042	1.066
All in Manufacturing and Mechanical In- dustries	1.657	1.321	2.179	2.684	3.436	3.481	3.822
[Males of]							
All male gainful workers .....	.536	.469	.815	1.009	1.180	1.271	1.325
All males in Manu- facturing and Mechani- cal Industries	1.852	1.511	2.566	3.144	4.084	3.993	4.299
[Females of]							
All female gainful workers .....	.011	.018	.011	.063	.076	.155	.150
All females in Manu- facturing and Me- chanical Industries..	.052	.068	.038	.234	.339	.688	.855

These figures confirm the general impression regarding the development of manufacturing and mechanical enterprises in recent decades. While independent manufacturers are still much in evidence, present-day business of any substantial size requires too much capital and supervision to be operated by individual owners. The elimination of independent small manufacturing establishments is extensive and mergers are rapidly consolidating manufacturing plants. From 1919 to 1930 mergers resulted in the disappearance of 8,003 independent manufacturing and mining enterprises.¹² With respect to the entire group which operates manufacturing and mechanical enterprises in the United States it may be said that 65 per cent as recently as 1910 were owners operating their own manufacturing plants, while 35 per cent were managing such businesses for others. Within the following twenty years the conditions have been reversed; for 40 per cent were independent manufacturers in 1930 and 60 per cent were managers or officials.

With respect to the combined group of Manufacturers and Managers, despite the emphasis on manufacturing in American industry, there were relatively few such positions in 1930;

¹² *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 241.

these occupations constituted only one per cent of all gainful workers.

While the number of persons listed as manufacturers and managers in the census of 1930 was nine times that of 1870, the increase in percentage of all gainful workers has hardly doubled. A like gain was made in the percentage that Manufacturers and Managers was of all workers in Manufacturing and Mechanical Industries during this period. However, the trend in recent decades shows a leveling off, indicating that whatever may be altering the composition of the national labor force does not result in a proportionate increase in the number of independent owners and managers. Also this trend is determined by male members of the group; females are negligible in quantity.

Foremen and Overseers

Occupations as foremen and overseers are found in factories and larger workshops and are relatively few. In 1930 their number was 338,504 or .7 per cent of the total gainfully employed, 2.5 per cent of all workers in the Manufacturing and Mechanical group. As has been previously indicated, males predominate in these occupations; but, since the turn of the century and with the development of power-machine production on a large scale, the number of both males and females listed as foremen and overseers has increased rapidly.

The census records are inadequate for the decades prior to 1890, but those available show that Foremen and Overseers made great numerical advances from 1900 to 1920. It appears that from 1920 to 1930 the number of foremen and overseers did not increase in proportion to all workers in manufacturing and mechanical industries. Business consolidation and technological advance are resulting in greatly increased output per man employed, with the consequence that increased production is possible without a proportionate increase in the number of foremen and overseers.

Engineers and Firemen (except Locomotive and Fire-Department)

Stationary engineers and firemen are required in manufacturing and mechanical plants which have their own heating and power units. This group of skilled and semiskilled workers has increased rapidly since the introduction of steam and elec-

tric power. In 1930 it was composed of 444,258 workers, almost entirely males, and constituted .9 per cent of the total gainfully employed, or 3.3 per cent of the whole number engaged in manufacturing and mechanical occupations.

While the number of engineers and firemen in 1930 was over 13 times that of 1870, the increase during the thirty years from 1870 to 1900 was 552 per cent, and only 94 per cent in the thirty years from 1900 to 1930. The actual increase in numbers between 1920 and 1930 was only 20,399. This was the smallest decennial increase for the group in the sixty-year period. Whether or not this trend presages a stationary or declining working force cannot be determined from the data before us but represents a possibility that should be carefully considered by vocational guidance officers.

If it be true, as so much accumulating evidence seems to suggest, that American industry is approaching a stage in which greatly increased production is possible without substantially enlarging the labor force, then it may well be that the maximum number of stationary engineers and firemen is rapidly being reached, especially if, as seems likely, electrical installations will further displace steam power. In the period of rapid industrial expansion following 1921, measuring, controlling, and power instruments of a semiautomatic or automatic type were installed in American factories at a more rapid rate than other industrial machinery. In fact, it is not an exaggeration to say that the enormous expansion in industrial production of the past decade is due primarily to these devices. Since depression focused the attention of employers and managers on the need for cutting labor costs, even more attention was paid to the utilization of semiautomatic control and power devices. Thus, for every \$1,000 invested in industrial machinery in 1921, \$5 went into instruments to control the use of machinery or power; by 1929 this figure had grown to \$10; and by 1933 it was \$15.¹⁸ The automatic character of these instruments reduces greatly the need for engineers and firemen.

Oilers of Machinery

The census listed this occupation as a subgroup beginning with 1910. Oilers of machinery in 1930 were only 31,210 in number, but they more than doubled in number in twenty

¹⁸ *Effects of Technological Developments upon Capital Formation*, WPA National Research Project, Report No. G-4, 1939, p. 6.

years. They represent but a small fraction of the Manufacturing and Mechanical category—.2 per cent. The three census records are insufficient to determine the trend, but it would seem reasonable to suppose that the number of machine oilers would increase as industrial processes become more mechanical.

Laborers in Administrative and Service Group

This group comprises all laborers in the Manufacturing and Mechanical group. Numerically, they form a very important group, containing 3,213,280 workers at their peak in 1930. This number was 6.6 per cent of all gainful workers, 23 per cent of the Manufacturing and Mechanical category. This great body of unclassified laborers is composed of workers of little skill who do the carrying and fetching and many of the simpler machine-tending tasks in production industries.

When compared with the trend of the total gainfully employed, the trend in number of unclassified laborers shows a gradual decline, indicating that alterations in these pursuits are causing a relative decrease in the employment of such

TABLE 65

LABORERS IN MANUFACTURING AND MECHANICAL INDUSTRIES: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870		1890	1900	1910	1920	
Total population.....	2.677	3.707	3.055	3.460	2.738	2.797	2.617
All gainful workers, male and female....	8.253	10.690	8.415	9.044	6.598	7.105	6.580
All in Manufacturing and Mechanical In- dustries	29.796	35.299	27.097	29.037	23.948	23.734	23.591
[Males of]							
All male gainful workers	9.473	12.184	9.875	10.547	8.074	8.430	8.109
All males in Manufac- turing and Mechan- ical Industries	32.726	39.279	31.079	32.871	27.936	26.475	26.313
[Females of]							
All female gainful workers	1.161	2.367	1.400	2.331	1.098	1.982	1.167
All females in Manu- facturing and Me- chanical Industries.	5.682	9.037	5.070	8.649	4.877	8.779	6.655

laborers. In 1880 they comprised 10.7 per cent of all gainful workers, but by 1930 they had fallen to the low point of only 6.6 per cent. A similar decline in the importance of this group is evident within the Manufacturing and Mechanical category: in 1880 they made up 35 per cent of this category, but by 1930 they had dropped to 23 per cent.

While it is true that a great transformation has taken place in manufacturing and mechanical industries which continually increases the automatic character of industry, nevertheless there is a vast amount of industrial work to be done of the strictly unskilled kind. From the numerical standpoint it must be observed that laborers in industry have increased in every successive decade since 1870 except 1900-1910. Their numerical trends have not been regular from decade to decade, reflecting perhaps the irregular development of manufacturing industry itself. But even in terms of numbers of laborers available for industrial employment there is a marked decline in the rate of growth. From 1870 to 1900, there were 1,597,178 new industrial laborers added to the roster; but in the thirty-year period from 1900 to 1930 only 584,018 new workers were listed as laborers in manufacturing and mechanical pursuits. The increase in laborers from 1920 to 1930 was considerably less than for the decade 1910-1920. All indications point to a marked slackening in rate of growth, foreshadowing the time, which when technological change is taken into account may not be far distant, when unskilled industrial labor will no longer increase.

B. BUILDING TRADES

General Characteristics (Tables 66 to 70, Chart 10)

Building Trades constitutes a major group within the Manufacturing and Mechanical category; it is second only to the Administrative and Service group in size among the fourteen subgroups comprising this category. In 1930 it contained 2,229,513 persons, constituting 4.5 per cent of the total gainfully employed and 16 per cent of the Manufacturing and Mechanical category. In Tables 66 to 68 a summary is presented of the subgroups which make up Building Trades. The vertical columns of the tables reveal the relative size of each of these

TABLE 66

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN THE BUILDING TRADES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Builders and Building Contractors .....	{ .... ....	.... ....	.... ....	.... ....	174,422 9.8	90,109 5.1	167,512 7.5
Carpenters and Apprentices	{ 360,496 60.8	390,595 57.3	618,242 54.4	600,252 49.5	823,189 46.4	892,184 50.9	933,564 41.9
Painters, Glaziers, and Enamelers	{ 86,657 14.6	130,319 19.1	222,233 19.6	277,541 22.9	337,855 19.0	323,032 18.4	528,931 23.7
Brick and Stone Masons ...	{ 89,710 15.1	102,473 15.0	160,845 14.2	160,805 13.3	169,402 9.6	131,264 7.5	170,903 7.7
Plasterers and Cement Finishers	{ 23,577 4.0	22,083 3.2	39,002 3.4	35,694 2.9	47,682 2.7	45,876 2.6	85,480 3.8
Paper Hangers	{ 2,490 .4	5,013 .7	12,369 1.1	21,990 1.8	25,577 1.4	18,746 1.1	23,323 1.3
Roofers and Slaters	{ 2,750 .5	4,026 .6	7,043 .6	9,067 .7	14,078 .8	11,378 .6	23,636 1.1
Plumbers and Apprentices..	{ 11,143 1.9	19,383 2.8	61,231 5.4	97,785 8.1	158,207 8.9	214,104 12.2	243,751 10.9
Building Operatives	{ 16,514 2.8	7,858 1.2	15,485 1.4	9,378 .8	11,733 .7	7,003 .4	18,442 .8
Structural-Iron Workers (building) .....	{ .... ....	.... ....	.... ....	.... ....	11,427 6.0	18,836 1.1	28,966 1.3
Total	{ 593,337 100.1	681,750 99.9	1,136,450 100.1	1,212,512 100.0	1,773,072 99.9	1,752,532 99.9	2,229,513 100.0

divisions since 1870; the horizontal columns determine the trend of development of each.

The effect of changes in types and methods of construction can be seen in the variation in the numbers of workers engaged in the building trades in successive censuses. Carpentering still remained the principal occupation at the time of the 1930 census, but its relative position in Building Trades had declined from 61 per cent in 1870 to 42 per cent in 1930. Builders and Building Contractors—occupations so little known in the earlier years that they were not listed separately until the 1910 census—made up 7.5 per cent of the Building Trades group in 1930. Plumbing was primitive and not of widespread use in the years when the United States was being carved out of the wilderness. Even in 1870 the 11,143 plumbers comprised only 2 per cent of the number of persons in the Building Trades. But changes in living habits and construction methods so altered these conditions that by 1930 there were almost a quarter

TABLE 67

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS
IN THE BUILDING TRADES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Builders and Building Contractors .....	{ ....	....	....	....	173,573	90,030	167,310
	{ ....	....	....	....	9.5	5.1	7.5
Carpenters and Apprentices	{ 360,496	390,595	618,044	599,707	823,143	892,005	933,509
	{ 61.0	57.3	54.5	49.6	48.6	51.0	42.0
Painters, Glaziers, and Enamellers	{ 86,569	129,993	220,960	275,782	334,814	319,697	524,150
	{ 14.7	19.1	19.5	22.8	18.9	18.3	23.6
Brick and Stone Masons ...	{ 89,710	102,473	160,804	160,638	169,387	181,257	170,896
	{ 15.2	15.0	14.2	13.3	9.6	7.5	7.7
Plasterers and Cement Finishers	{ 23,577	22,083	38,987	35,649	47,676	45,870	85,477
	{ 4.0	3.2	3.4	2.9	2.7	2.6	3.8
Paper Hangers	{ 2,471	4,359	12,315	21,749	24,780	18,338	26,872
	{ .4	.7	1.1	1.8	1.4	1.0	1.2
Roofers and Slaters	{ 2,750	4,026	7,040	9,065	14,078	11,878	23,636
	{ .5	.6	.6	.7	.8	.7	1.1
Plumbers and Apprentices..	{ 11,143	19,383	61,185	97,659	153,203	214,101	243,750
	{ 1.9	2.8	5.4	8.1	9.0	12.2	11.0
Building Operatives	{ 13,955	7,853	15,472	9,351	10,212	6,983	15,419
	{ 2.4	1.2	1.4	.8	.6	.4	.8
Structural-Iron Workers (building) .....	{ ....	....	....	....	11,427	18,836	28,966
	{ ....	....	....	....	.6	1.1	1.3
Total	{ 590,671	681,265	1,134,807	1,209,600	1,767,293	1,748,495	2,222,965
	{ 100.1	99.9	100.1	100.0	100.0	99.9	100.0

of a million plumbers, constituting 11 per cent of Building Trades.

While the number of brick and stone masons almost doubled in the sixty years preceding 1930, they declined from 15 per cent of the Building Trades group in 1870 to 7.7 per cent in 1930. Formerly they were the second most important group within Building Trades; but that place has now been taken by Painters, Glaziers, and Enamellers. This latter group was 14 per cent of Building Trades in 1870 but by 1930 amounted to 23 per cent, attesting the more general use of glass, enamel, and paint, which has come with changing methods of construction.

In Table 69 percentages are given for the Building Trades group in relation to the total population and to the total gainfully employed. Building Trades maintained an almost even position with respect to the total population throughout the census decades, indicating that proportionately the same corps of building tradesmen has been required to construct and re-

TABLE 68

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE BUILDING TRADES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Bulldozers and Bulldozing Contractors .....	{ ....	....	....	....	849	79	202
	{ ....	....	....	....	14.7	2.0	3.1
Carpenters and Apprentices .....	{ ....	....	198	545	46	179	55
	{ ....	....	12.1	18.7	.8	4.4	.8
Painters, Glaziers, and Enamelers	{ 88	326	1,273	1,759	2,541	3,335	4,781
	{ 3.3	67.2	77.5	60.4	44.0	82.6	73.2
Brick and Stone Masons .....	{ ....	....	41	167	15	7	7
	{ ....	....	2.5	5.7	.3	.2	.1
Plasterers and Cement Finishers .....	{ ....	....	15	45	6	6	3
	{ ....	....	.9	1.5	.1	.1*
Paper Hangers	{ 19	154	54	241	797	408	1,456
	{ .7	31.8	3.3	8.3	13.8	10.1	22.3
Roofers and Slaters .....	{ ....	....	3	2	....	....	....
	{ ....	....	.2	.1	....	....	....
Plumbers and Apprentices .....	{ ....	....	46	126	4	3	1
	{ ....	....	2.8	4.3	.1	.1*
Building Operatives	{ 2,559	5	13	27	1,521	20	23
	{ 96.0	1.0	.8	.9	26.3	.5	.4
Structural-Iron Workers (building) .....	{ ....	....	....	....	....	....	....
	{
Total	{ 2,666	485	1,643	2,912	5,779	4,037	6,528
	{ 100.0	100.1	100.1	99.9	100.1	100.0	99.9

* Less than .001 per cent.

TABLE 69

WORKERS IN BUILDING TRADES: PERCENTAGE OF TOTAL POPULATION, OF ALL
GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING
AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	1.539	1.359	1.814	1.595	1.927	1.657	1.816
All gainful workers, male and female	4.744	3.920	4.998	4.170	4.645	4.211	4.565
All in Manufacturing and Mechanical Industries	17.130	12.944	16.094	13.390	16.862	14.067	16.368
[Males of]							
All male gainful workers	5.536	4.620	6.029	5.092	5.873	5.288	5.838
All males in Manufacturing and Mechanical Industries	19.100	14.900	19.000	15.800	20.300	16.600	18.900
[Females of]							
All female gainful workers .....	.145	.019	.042	.054	.074	.047	.061
All females in Manufacturing and Mechanical Industries .....	.700	.100	.200	.200	.300	.200	.400

pair the housing of the nation. Neither did the position of these workers greatly alter with respect to the trend of gainful workers, of which group it was from 4 to 5 per cent in all the censuses from 1870 to 1930.

A comparison of building operations and number of workers is made in Table 70.

TABLE 70

COMPARISON OF BUILDING PERMITS, BUILDING TRADES, TOTAL GAINFULLY EMPLOYED, AND TOTAL POPULATION, 1880-1930
(PERCENTAGES BASED ON 1880)*

Census	Number of Building Permits	Building Tradesmen	Total Gainfully Employed	Total Population
1880.....	100.0	100.0	100.0	100.0
1890.....	330.1	166.7	130.7	124.8
1900.....	210.4	177.8	167.2	151.5
1910.....	412.5	260.1	219.4	183.4
1920.....	243.7	257.1	239.3	210.8
1930.....	728.0	327.0	280.8	244.8

* Computed from figures reported in Arthur Burns, *Production Trends in United States since 1870*, National Bureau of Economic Research, New York, 1934.

Despite the resistance of construction craftsmen to innovations which tend to degrade their skills and to reduce their number, the general lack of newer materials in the building industry and its tendency to preserve older methods, and the conservative tastes of the public in architectural style, many drastic changes have occurred during the half-century reviewed in the table. The production of lumber rose from 18,091 million board feet in 1879 to a peak production of 46,000 million in 1907, and declined to 26,100 million in 1930.¹⁴ Steel production increased from 1,247,000 long tons in 1880 to 56,433,000 long tons in 1929, much of which material was used in construction.¹⁵ The 1937 figure is 50,568,701.¹⁶

The number of building permits issued is admittedly a crude measure of the growth of building construction and repair. Building permits are not required in rural areas or very

¹⁴ George F. Warren and F. A. Pearson, *The Physical Volume of Production in the United States*, Cornell University Publication, 1932, p. 44. A net decline in output of lumber of 61 per cent is reported for the period 1929-1934 (C. A. Bliss, *op. cit.*, p. 13). See also Table 54, above.

¹⁵ Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, 1934, pp. 296-97.

¹⁶ *Statistical Abstract of the United States*, 1938, p. 716.

small towns. The figures upon which Table 70 is based include only areas requiring such permits. If all construction were included, the growth in the productivity of the entire industry which employs building tradesmen would unquestionably be greater than that indicated in the table by the index of building permits.

More significant for our purpose in determining the productivity of building-trades workers would be the total value of new buildings; but these figures are not known for the earlier decades. For example, few skyscrapers were built prior to 1900. One Empire State Building permit would involve a cost and the employment of a number of workers undoubtedly several hundred times that required by many building permits for small dwellings. Yet, in the table, such facts do not appear. The table, therefore, shows a decided understatement of the situation.

The first noteworthy feature of the trend in the building trades is that it tends to follow, but does not rise and fall uniformly with, trends in building permits. This is probably due to the fact that a skilled worker is not able to shift his occupational status readily with changes in labor demands.

The broad fact is that the over-all productivity of workers in building trades has increased enormously. During the fifty years preceding 1930 an increase of 628 per cent in construction, as represented by the number of building permits issued (already shown to be an understatement), was accomplished by an increase of only 227 per cent in the labor force available for that construction. It must be noticed, however, that changes in construction methods have resulted in the employment also of factory workers to prepare ready-made materials and special tools now used in erecting buildings. But the significant fact remains, that per-worker productivity has greatly increased and that the number of workers in these trades has not grown in proportion to output. This means an advancing technological displacement.

Moreover the ultimate effect of this condition has not yet been felt because the more important labor-saving devices are of recent installation. Not only are an increasing number of essential building materials and parts prefabricated and treated in factories sometimes far removed from the construction site, but many new tools and methods of construction have

been moved to the construction job itself, thus partly mechanizing the work done. Power cranes, portable power saws, joiners, drills, electric elevators, plaster and cement mixers, mechanical cement pourers, and automatic electric welders are innovations introduced since 1910 and used extensively only since 1920. The use of fabricated doors, windows, girders, floors, walls, roofing, and interior fixtures has caused a displacement of many skilled artisans who formerly constructed these articles entirely on the premises during the process of building.

The influence of such modern methods and appliances is noticeable whenever a building boom greatly increases construction activities. The first startling effect was seen in the fact that during the great building boom in the 1920's building permits increased 299 per cent in that decade, while building-trades workers, who during that time experienced their greatest decade growth, increased only 149 per cent.

These figures reveal nothing concerning the character and quality of building construction, nor its adequacy in meeting the housing needs of the nation. More important still is the fact that census figures on occupations give the total available labor force and not those actually employed either full or part time. The building trades are notoriously affected by layoffs, ranging in the prosperous year of 1929 (according to the careful studies of the Brookings Institution) from 11 per cent of their workers in July to 24 per cent in March.¹⁷ These studies show, furthermore, that the construction industry was overmanned by at least 270,000 in relation to 1929 requirements for such workers, and that even assuming a maximum efficient use of the national labor force in that year, which would have enlarged the demand for construction somewhat,¹⁸ a full-time use of building-trades artisans could have been obtained and still have released some 135,000 workers.

The building industry makes poor use of its labor force for several reasons. Building demands come at unpredictable times and are often temporarily widespread. During these times actual shortages of workers may occur in particular localities or even throughout the nation. The nature of construc-

¹⁷ Edwin G. Nourse *et al.*, *America's Capacity to Produce*, Brookings Institution, Washington, D.C., 1934, pp. 410, 430.

¹⁸ The Brookings study showed that plants, equipment, and man power were working at approximately 80 per cent capacity in 1929. Were purchasing power more widely diffused, obviously the demand for building construction would increase.

tion work forces layoffs during inclement weather. During a prosperous building era many new workers are attracted to these occupations by the lure of daily or weekly high rates of pay. The period of apprenticeship is relatively long, and once having learned the trade there is an inclination for these skilled artisans to remain in it through good or bad times. The combination of these circumstances produces a situation whereby at any given time, except in rare nationwide building booms, there is a surplus of building tradesmen. A reasonable estimate of the necessary reserve of workers required to take care of time lost in changing jobs, etc., is placed by the Brookings studies at 3 per cent of the workers in the building trades, which would still leave the excess of such workers in the prosperous summer of 1929 at over 225,000 persons.

The difficult problems of distributing and moving building tradesmen so that they will be located at or near the place of need, the fluctuations of seasonal employment, apprenticeship, and the organization rules of the trades, all must be solved before an effective use of the labor force can be made.

But even if these problems were solved, there would still remain an uncontrolled factor which is probably basic, namely, the business cycle as it affects demand for building and construction.¹⁹ The occupational trends to 1930, which are the result of the interplay of all forces at work in the field, show a growth in the number of building tradesmen. A more effective use of these workers could be made if their number were kept at or near that which is required to replace those whom death or disability remove from the ranks.

In the face of these many factors one wonders how the building trades, and even some of the typical hand crafts among them, have been able to hold their own in the total national labor force. The answer probably lies primarily in the fact that their work often requires not only involved muscular movements and dexterity but frequently the exercise of judgment, and usually must be performed in locations where mass factory methods cannot be used satisfactorily. Furthermore, these skilled artisans have enjoyed in former years incomes

¹⁹ The over-all percentage decline in "construction" from 1927 to 1935 is placed at 55 (C. A. Bliss, *Production in Depression and Recovery*, National Bureau of Economic Research, Bulletin 58, November 15, 1934, p. 4). By 1939 "building construction" had apparently closely approximated its 1929 level, largely because of public-works expansion (*Economic Notes*, Labor Research Association, 80 East 11th Street, New York City, March 1939).

averaging somewhat above the level of most manual laborers and have developed a pride in their craft and a group solidarity and discipline in their trade unions, all of which have enabled them to ward off the modern threat of mechanization.

Whether or not the position held by the building trades can be maintained is to be doubted. They have been forced to give ground in every occupation where technological advance has proved economically practical. But this does not suggest that the number of building tradesmen has reached its maximum or that the housing requirements of the people have been adequately met. On the contrary, all housing surveys show a crying need for new dwellings and the improvement of existing houses. It may be that under some stimulus such as government housing schemes the number of building tradesmen will increase. But, unless any such impetus is sustained, the trends to date indicate that in relation to the total population and to the total gainfully employed, little change for the building trades as a whole is to be expected.

There remains another important possibility which may seriously affect these trades. That is the possibility of a widespread adoption of factory-fabricated houses. This process is admittedly in its initial stages, but only financial obstacles and social custom prevent its advance. Such factors have never proved sufficiently strong to resist technological changes in the past. Observers believe that the changes will be quite gradual.²⁰ If this is true, it is probable that no appreciable shift in the number of building tradesmen will occur suddenly.

But something that is already in evidence is the shift in emphasis on the forms of labor demanded of building tradesmen, even when they retain their former craft titles, and the increasing tendency toward partial mechanization of these occupations. If this movement goes forward at the present rate, without being compensated for by a marked advance in building demands, it is possible that the per-worker productivity will advance sufficiently to record a decline in the number of building tradesmen. Despite the many efforts at pump-priming the construction industry during the recent prolonged depression, economists and government officials quite generally agree that little advance in building has been recorded as compared with recovery in other aspects of our economy.

²⁰ Jonathan Norton Leonard, *Tools of Tomorrow*, Viking Press, New York, 1935, pp. 293 ff.

Comparison of Building Trades with Total Population and All Gainful Workers

It is important not only to observe the trend in Building Trades as compared with the developments taking place in the whole population and the total gainfully employed but to determine what the circumstances may be concerning the actual number of persons engaged in building trades. Their number increased from 593,337 persons in 1870 to 2,229,513 in 1930, a gain of 275 per cent. Each successive decade, excepting that ending in 1920, showed an increase in the number of building tradesmen; but the development of this group has been characterized by great fluctuations. This is indicated in Table 71.

TABLE 71

PERCENTAGE CHANGES IN BUILDING TRADES COMPARED WITH THAT OF THE TOTAL POPULATION AND OF THE TOTAL GAINFULLY EMPLOYED, 1870-1930

Census	Total Population	Total Gainfully Employed	Total of Woodworkers
1870 .....	.....	.....	.....
1880	+30.1	+39.1	+14.9
1890	+24.8	+30.7	+66.7
1900	+21.4	+27.9	+ 6.7
1910	+21.0	+31.3	+46.2
1920	+14.9	+ 9.0	- 1.2
1930	+16.1	+17.3	+27.2
1930 over 1870.....	+218.4	+290.5	+275.7

These fluctuations are related to the business cycle, although they do not coincide with it. The building industry has been characterized by extensive lags which result from investment in more profitable forms of enterprise, followed by expansions or building booms. Warren and Pearson assign an average of 18 years between the peaks of building activity.²¹ These changes undoubtedly have their effect upon building tradesmen, tending to reduce their numbers, especially the number of apprentices, during some periods and to expand them at others.

In the first thirty years of record, from 1870 to 1900, the number of workers in the building trades increased by 619,175, or 104 per cent. In the last thirty years, from 1900 to 1930, the number added was 1,017,001, but the rate of increase had dropped to 84 per cent.

²¹ "The Building Cycle," *Fortune*, August 1938, p. 85.

In 1880 there were 88,413 more building tradesmen than ten years before, but in 1930 there were 476,981 more than in 1920. These phenomena do not indicate continuous growth, however, for two plateaus are noted. In fact, there was a slight decline in actual numbers of building-trades workers in 1920 as compared with 1910, and the rate of increase fell off perceptibly between 1890 and 1900. For the entire sixty-year period the rate of growth of the Building Trades group exceeds the rate of growth of the total population but is less than that of the total gainfully employed. This last condition is of considerable value in predicting the trends for this occupational group, because the decade-by-decade figures are too erratic for such purposes.

Why these conditions exist with respect to the workers in building trades is not clearly evident. That the periodic demand for buildings causes such fluctuations in the labor supply is a reasonable hypothesis, and if it were the determining factor a forecast of the cycle for the construction industries would permit an accurate estimate of the future needs for such workers. But other factors, incalculable and unforeseen, are active and prevent an exact forecast under prevailing conditions. It appears safe to say only that the development of building trades may be expected to follow an erratic course similar to that which has already been indicated, unless some great sudden change in technology or some alteration in public policy becomes a dominant force which may either increase or decrease appreciably the number of such workers.

There is little evidence that would point to any long-sustained increase in demand for building construction, and no reason to believe that much greater attention will be paid to this form of investment by the investors of the nation than in the past. There are very real possibilities that the per-worker productivity of building tradesmen will continue to grow at an even more accelerated rate.

Unless the effective demand enlarges in keeping with this increased productivity, an actual reduction in the number of building-trades workers will take place. The extent of this reduction in employed workers might be concealed for some time by the census, which might still record many persons as "gainfully employed" who have for all practical purposes ceased to be a part of the steadily employed force of these

crafts. This fact makes it imperative to watch carefully the course of building construction, its amount, character, the methods it uses, and the number of workers actually employed in it. Only such data will depict the true course of development, and only such figures can be used as the basis for training and placing the labor force of the nation.

Sex Composition of the Building-Trades Group

This group of workers is almost exclusively male. The ratio of men to women in this group is shown in the following percentage display.

Census	Percentage	
	Males	Females
1870	99.6	0.4
1880	99.9	0.1
1890	99.9	0.1
1900	99.8	0.2
1910	99.7	0.3
1920	99.8	0.2
1930	99.7	0.3

By referring to Tables 67 and 68 the reader may ascertain the relative importance of the sexes in the several subgroups which make up Building Trades. Most of the females in these trades (over 95 per cent in 1930) were painters, glaziers, enamelers, or paperhangers. The nature of most building-trades work, involving as it does muscular effort and labor under severe or hazardous conditions, prevents any great increase in the number of women in these trades.

Builders and Building Contractors

Despite the enormous advance in the number of building permits granted in 1930 as compared with 1910, the number of persons listed as Builders and Building Contractors had declined by 6,910 from the number in these occupations in 1910. This would seem to indicate that a concentration is occurring in the field of building construction and that larger enterprises or a greater variety of operations are being handled by the same builders or contractors.

The census of 1920 was taken during a building slump. The figures recorded serve to illustrate the hazards confronting builders and building contractors. The decline from 1910 to 1920 in the number of persons following these occupations was

84,313, or 48 per cent. Most builders and contractors are recruited from artisans engaged in the building trades. When building slumps are prolonged, a certain proportion of them return to their artisan trades.

But the trend toward consolidation of operations would suggest that present tendencies toward concentration will have the effect of preventing an expansion in or even of reducing the Building Contractor group relative to the growth in building activity.

Carpenters and Apprentices (Tables 72 and 73)

Carpentering is one of the time-honored crafts, and since 1860 these craftsmen, with a few apprentices, have made up

TABLE 72

CARPENTERS AND APPRENTICES: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870		1900		1910		1920	
Total population .....	.935	.779	.987	.790	.895	.844	.760	
All gainful workers, male and female.....	2.883	2.246	2.719	2.065	2.157	2.144	1.912	
All in Manufacturing and Mechanical Industries	10.408	7.415	8.755	6.629	7.829	7.162	6.854	
[Males of]								
All male gainful workers	3.379	2.649	3.284	2.525	2.735	2.698	2.452	
All males in Manufacturing and Mechanical Industries	11.672	8.540	10.335	7.868	9.465	8.473	7.955	

* Numbers of women so small as to have only minor significance; see Table 68.

by far the largest occupational classification within the Building Trades group. In 1930 the number in this subgroup was 933,594, which was 42 per cent of all building-trades workers, 6.8 per cent of the Manufacturing and Mechanical category, and 1.9 per cent of the national labor force. Although the number of carpenters has shown a continual increase in each census except that of 1900 (the 1870-1930 percentage increase being 159), a continuous decline has occurred in their percentage of the Building Trades group in each census except 1920 (the 1870-1930 decline being 19 per cent). Carpenters have

shown a continuous decline since 1900 in their percentage of the total population, of all gainful workers, and of all manufacturing and mechanical workers. Prior to 1910 their relation to all these groups showed erratic percentages. Although changes in census classifications do in some instances account for differences in numbers and percentages of occupational groups, in the case of carpenters very much the same classifications prevailed in the earlier as in the later decades; the only redistribution which would affect the carpenters being the added classification of Builders and Building Contractors from 1910 to 1930, which, if added to the Carpenter group, from which they have come for the most part, would not materially alter the trends just indicated.

The greatest ten-year gains were recorded during the brisk building periods from 1880 to 1890 and from 1900 to 1910. The building activity which occurred during the 1920's, although adding several times more to the nation's building and housing than the previous periods, nevertheless contributed less than a fifth as many persons to the force of available carpenters and apprentices. In 1890, there were listed 227,647 more carpenters than in 1880, an increase of 58 per cent; the 1900 to 1910 addition of 222,937 carpenters caused a gain of 37 per cent; whereas the numerical increase of 41,380 from 1920 to 1930 resulted in an increase of only 4.6 per cent. Such facts indicate that changes have taken place in the building industry which make it possible to erect more and better buildings with proportionately fewer carpenters, and that unless a transformation occurs to make increased demands for carpentering skills, there is little likelihood of any marked expansion in the ranks of carpenters.

While the census lists all carpenters under Building Trades, not all such workers are engaged in the construction and repair of buildings. Where they are located may be determined from Table 73.

In 1910, 83.6 per cent of all carpenters were in building trades, 16.4 per cent in other industries. By 1930, 82.5 per cent were in the building trades and 17.5 per cent had found their places in other industries, a shift of 1.1 per cent in twenty years. This would seem to indicate considerable stability with carpenters and their primary relationship to the building-construction industry.

TABLE 73
PERCENTAGE DISTRIBUTION OF CARPENTERS AND
THEIR APPRENTICES BY INDUSTRIES FOR
1910 AND 1930

Industry	1910	1930
Agriculture .....	.....	.1
Forestry .....	.....	.....
Mining quarries .....	.7	.7
Oil, gas, salt wells .....	.1	.....
Building	83.6	82.5
Chemical and allied industries .....	.1	.6
Clay, glass, and stone .....	.2	.2
Food and allied industries .....	.2	.3
Iron and steel	5.3	5.2
Metals .....	.1	.2
Leather .....	.1	.1
Lumber and furniture	2.1	2.1
Paper, printing, etc. ....	.1	.2
Textiles .....	.3	.5
Miscellaneous manufacturing	1.5	1.1
Construction, maintenance, roads.....	.8	.7
Steam and street railroads	4.0	3.5
Water transportation .....	.3	.4
All other .....	.4	1.7
Total percentage	99.9	100.1
Total number all industries.....	823,189	933,564

Painters, Glaziers, and Enamelers (Table 74)

This occupational classification, like that of Carpenters, is one of the major subgroups within Building Trades. The data submitted in the tables cover comparable groups for all six decades under review. The total number of painters, glaziers, varnishers, enamelers, jappanners, and lacquerers in 1930 was 528,931, which was .4 per cent of the total population, 1 per cent of all gainful workers, and 23 per cent of all workers in Building Trades. The total number of painters and allied workers increased over six times from 1870 to 1930. With respect to the total of gainful workers, a decline was recorded from 1890 to 1920, while an increase during the next ten years brought this subgroup to a number greater than any recorded in the sixty years.

Contrary to the case of the Carpenters group, the Painters, Glaziers, and Enamelers group not only expanded with the building activities of the 1920's but made its greatest ten-year increase in numbers from 1920 to 1930. The number of workers added was 205,899, a gain of 63 per cent in the ten years. This

increase occurred in spite of universal adoption of factory-installed glass and factory-made enamel plates, and the wide use of mechanical sprayers and dippers. Some hint of this situation may be gained from the fact that the 1920-30 decade experienced the largest production of white lead (the base of paint) which had ever been reached in the United States. The production of white lead in 1890 was 78,000 tons; in 1929 it was 147,000 tons.²² The value of window and plate glass was \$19,-589,000 in 1904 and \$76, 153,692 in 1929.²³ The increase noted in these products indicates a wide-spread use in industries other than building construction.

Not all painters, glaziers, and enamelers are working on buildings; many are engaged in various manufacturing industries, especially automobile factories. How such workers are distributed may be seen in Table 74.

Of the total number, 78 per cent were in the building trades

TABLE 74
PERCENTAGE DISTRIBUTION OF PAINTERS, GLAZIERS, ENAMELERS,
ETC., BY INDUSTRIES FOR 1910 AND 1930

Industry	1910	1930
Agriculture .....	.....	.....
Mining and quarries .....	.....	.1
Oil and salt wells .....	.....	.1
Building industry	81.8	78.5
Chemical and allied industry .....	.1	.7
Clay, glass, and stone .....	.2	.1
Food and allied .....	.....	.2
Iron and steel	9.8	10.1
Metal .....	.3	.3
Leather .....	.1	.2
Lumber and furniture	2.8	2.6
Paper and printing .....	.....	.2
Textile .....	.2	.3
Miscellaneous manufacturing	1.6	1.7
Garages, etc. ....	.....	.3
Steam and street railroads	2.3	1.6
Telephone and telegraph .....	.....	.....
Water and other .....	.1	.1
Construction roads, etc. ....	.1	.....
All others .....	.4	3.0
Total percentage	99.9	100.1
Total number all industries.....	337,355	528,931

²² Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, New York, 1934, pp. 300-301.

²³ Department of Commerce, Bureau of the Census, *Census of Manufactures, 1919, 1920, X, 835; Census of Manufactures, 1929, 1930, II, 870.*

in 1930 and 21 per cent were scattered throughout the other industries, most of them being in the automobile and furniture industries. In 1910, 82 per cent were in the building trades and 18 in other industries. The shift toward other industries was marked by a gain of 3 per cent in the twenty years.

Brick and Stone Masons

While this group of workers almost doubled in number during the sixty years, its trend of growth has been irregular. Its greatest ten-year increase was 58,372 in the decade 1880 to 1890. In the period from 1890 to 1910 this group remained almost stationary, and a drop of 38,138 was recorded in actual numbers of its workers from 1910 to 1920, so that the gain from 1920 to 1930 just about covered the loss of the previous ten years and made the number of brick and stone masons about equal with that labor force in 1910. This occurred despite an enormous increase in per-man productivity in the building trades. It is probable that the shift from brick and stone to cement construction will continue to affect the number of masons even more drastically in the future.

The figures presented for brick and stone masons are practically comparable. Other groups of related workers are too small to seriously affect the series. For example, in 1900 masons' laborers were included in the group, but they totaled less than 10,000 workers. Apprentices and helpers are included except for 1870 and 1880. They are a very small number.

The trend of this subgroup, when compared with the trend of the total gainfully employed, is downward, indicating that these workers have not participated, as have other groups, in the growth of the national labor force, nor have they been able to maintain their relative position in the total population in successive census decades. The gain made in 1930, as compared with 1920, came during a period of great building activity; indicating that the number of masons responds to such conditions. Should such periodic expansions of building continue, the trend in number of masons will probably continue to move irregularly.

Of all brick and stone masons reported in 1930, 92 per cent were listed in building trades, and only 8 in other industries. In 1910, 94.5 per cent of brick and stone masons were in the building trades and 5.5 in other industries. The shift toward

these other industries decreased 2.5 per cent in the twenty years.

Plasterers and Cement Finishers

This group of workers is growing both numerically and relatively. The greatest ten-year gain was made from 1920 to 1930, when 39,604 more plasterers and cement finishers were added to the group, a gain of 86 per cent. Except for the decade from 1910 to 1920, when an actual loss was noted, each successive census has recorded gains in numbers of plasterers and cement finishers.

Fewer such workers are required in proportion to their output as compared with carpenters and other artisans who use different materials; a change to plaster and cement in building construction may occur without making great increases in the number of plasterers and cement workers but causing considerable reduction in the number of other types of building craftsmen. For example, the present building-trades labor force contains 933,000 carpenters and only 85,000 plasterers and cement finishers. If these groups directly duplicated each other and a transfer was made from wooden material to cement and plaster, it is probable that a much-reduced labor force could erect and repair the same number of buildings. Even though the trend is in this direction, it is not indicated that this expanding group of plasterers and cement workers will become of great numerical importance among the gainfully employed. They may, however, supplant other groups of workers which have such importance at the present time.

Of all plasterers and cement workers in 1930, 96.8 per cent were engaged in the building trades and 3.2 per cent were connected with other industries. In 1910 all plasterers and cement workers were listed in the building trades.

Paper Hangers

This occupation is of minor numerical importance in the building trades, only 28,328 paper hangers being listed in the 1930 census. This subgroup made up a very small fraction of the total population, only .06 per cent of the national labor force, and 1.3 per cent of the Building Trades group. In relation to the total gainfully employed this occupational division increased in importance. Its number in 1930 was the largest recorded in any census, representing a substantial gain from

1920, when the recorded number of paper hangers was smaller than in either the census of 1910 or that of 1900.

While this group shows increases in both its proportionate size and its actual number, it is too small and its rate of growth too slow to make any significant difference in the composition of the nation's labor force. This occupation does represent one of the few building trades, however, which is subject to the entrance of female workers, who are making considerable inroads into it.

Roofers and Slaters

Specialization of labor and materials in the building trades has resulted in the distinct trade of roofers. These workmen are required whenever the roofing material used is not wood, which is the case in an increasing number of construction jobs. They have very largely replaced shinglers, who were the roofers of the era prior to this century. Although they constitute only a minor group in the building trades, their numbers are growing. At the 1930 census this group contained 23,636 people, or 1 per cent of the Building Trades group.

The development of the roofing trade follows the building cycle; it is assuming a slightly more important place in both the total gainfully employed and the total population and has doubled in numbers from 1920 to 1930.

The study of trends, and the evidence available concerning occurrences in building and construction lead to the conclusion that Roofers and Slaters will continue to grow numerically for some time. The workmen will, of necessity, meet the competition of labor-saving tools and materials; but much of the work done by them yields so slowly to mechanization that the prospect is for a continuance of their increase.

Plumbers and Apprentices, Gas and Steam Fitters

Plumbing and fitting are expanding occupations, both in actual numbers and relatively. The number of plumbers and allied workers increased from 2 per cent of the building trades to 11 per cent in 1930. The number has not fluctuated with the trends in building permits as have other major groups within Building Trades, indicating that this occupation is relatively free from such cycles. The explanation of this situation is probably found in the fact that congested population requires modern plumbing as a health measure and that many large-

scale, socially developed enterprises, such as sewage disposal, central steam-heating systems, and water and gas mains, have been set up in recent decades.

The standardizing of plumbing supplies and equipment has greatly reduced the skill required of these craftsmen and increased their per-man productivity. These conditions undoubtedly degrade the craft, making it accessible to many less skilled workers, and tend to reduce the number of plumbers needed. So far, however, the increased productivity has not reached a point comparable with the increased demand for plumbing service, where an actual decrease in number of workers has resulted. In fact, about three times as many plumbers and gas and steam fitters were added to the labor force from 1920 to 1930 as were added in the decade 1870-80.

Despite the great increase in the amount of plumbing installed in successive decades and the noticeable increase in the number of plumbers and allied workers, the rate of increase in the number of workers is showing pronounced evidence of that slackening which precedes the maximum labor force and an actual decline in numbers. Each census of this century shows actually fewer plumbers added to the labor force than the previous census, so that by 1930 the number of plumbers and gas and steam fitters added in the preceding ten years was less than half as many as in the decade from 1900 to 1910. Yet it was during the past thirty years that the widest use was made of materials which required the services of plumbers. Inasmuch as the greatest building boom on record occurred during the period from 1920 to 1930, it is obvious that plumbers and gas and steam fitters did not share proportionately in this development, for not only was the rate of growth of this occupational group less in that decade than formerly but it experienced a decline relative to both the total gainfully employed and the total population.

Building Operatives

This is a miscellaneous group of skilled workers. Previous to 1910 they were called "building mechanics not otherwise specified." In 1930, they totaled 18,442, and were only .8 per cent of all building-trade workers.

Structural-Iron Workers (Building)

The census records of numbers of structural-iron workers are available only for the period from 1910 onward. This, in

itself, is evidence that such workers were considered of little numerical importance in previous years. In fact, by 1930 they numbered only 28,966 persons—1.3 per cent of those engaged in the building trades, and .06 per cent of the total gainfully employed.

During the period of generally depressed building conditions, from 1910 to 1920, the number of structural-iron workers increased. This would seem to show that whatever construction work was being done called for additional iron workers. That their number will continue to grow seems highly probable in view of the marked shift from wooden and brick construction to reinforced concrete and steel.

Offsetting this growth, however, must be reckoned the influence of an increasing number of labor-saving devices. The standardization and fabrication of steel trusses and girders has not only made their use in construction more practical, but has reduced the number of operations performed by steel workers on the construction job. Pneumatic drills, power lifts, and electric-welding tools have likewise saved much labor, and their use may be expected to increase as the shift in type of building greatly extends the use of steel and iron."

C. ELECTRICAL WORKERS

General Characteristics (Tables 75 and 77, Chart 10)

Electrical workers listed in the Manufacturing and Mechanical group numbered 451,524 workers in 1930. The census recorded such occupations separately for the first time in 1900, when electricians and their apprentices were enumerated. Ten years later electrical workers employed in light and power plants and in electrical machinery and supply factories were added to the group. These, together with the electricians and apprentices, made up Electrical Workers in 1930.

Such workers were .36 per cent of the total population in 1930, .92 per cent of the total of gainful workers, and 3.3 per cent of the Manufacturing and Mechanical category. With respect to these groups, the increase in the number of electrical workers has been more rapid than that of any of the three, and

²⁴ For a personnel list in the Building Trades, see *Fortune*, May 1938; see also W. C. Bober, "Building Begins a New Cycle," *The Annalist*, March 20, 1936, p. 440.

TABLE 75
NUMBER AND PERCENTAGE DISTRIBUTION OF GAINFUL WORKERS IN
ELECTRICAL INDUSTRIES, 1900-1930

Group	1900	1910	1920	1930
MALE AND FEMALE				
Electricians and Apprentices	{ 50,717 ^a	122,902 ^b	222,526	284,928
Electric Machinery and Supply Factory	{ 100.0	78.6	73.4	63.1
Workers	{	24,677	64,841	117,327
	{	15.8	21.4	26.0
Electric Light and Power Plant Workers	{	8,880	15,949	49,269
	{	5.7	5.3	10.9
Total	{ 50,717	156,459	303,316	451,524
	{ 100.0	100.1	100.1	100.0
MALE				
Electricians and Apprentices	{ 50,308 ^a	122,815 ^b	222,502	284,883
Electric Machinery and Supply Factory	{ 100.0	84.6	80.7	70.1
Workers	{	13,636	37,452	72,012
	{	9.4	13.6	17.7
Electric Light and Power Plant Workers	{	8,704	15,610	49,218
	{	6.0	5.7	12.1
Total	{ 50,308	145,155	275,564	406,113
	{ 100.0	100.0	100.0	99.9
FEMALE				
Electricians and Apprentices	{ 409 ^a	87 ^b	24	45
Electric Machinery and Supply Factory	{ 100.0	.8	.1	.1
Workers	{	11,041	27,389	45,315
	{	97.7	98.7	99.8
Electric Light and Power Plant Workers	{	176	339	51
	{	1.6	1.2	.1
Total	{ 409	11,304	27,752	45,411
	{ 100.0	100.1	100.0	100.0

^a Taken out of Professional category.

^b Approximate only.

TABLE 76
ELECTRICAL WORKERS: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL
WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND
MECHANICAL INDUSTRIES, 1900-1930

Base	1900	1910	1920	
Total population .....	.067	.170	.287	.368
All gainful workers, male and female .....	.174	.410	.729	.925
All in Manufacturing and Mechanical Industries .....	.560	1.488	2.434	3.315
[Males of]				
All male gainful workers .....	.212	.482	.833	1.067
All males in Manufacturing and Mechanical Industries .....	.660	1.669	2.617	3.461
[Females of]				
All female gainful workers .....	.008	.140	.325	.422
All females in Manufacturing and Mechanical Industries .....	.029	.622	1.438	2.408

electrical workers have become a larger part of each group in the successive decades since 1900. From 1900 to 1910 the number of electrical workers increased by 105,742 persons, while in the period from 1920 to 1930 a total of 148,208 workers were added to this labor force.

The rate of increase in the number of electrical workers in comparison with the total population and with all gainful workers is shown in Table 77.

TABLE 77

PERCENTAGE INCREASE OF ELECTRICAL WORKERS, OF THE TOTAL POPULATION, AND OF THE TOTAL OF GAINFUL WORKERS, 1900-1930

Census	Total Population	Total Gainful Workers	Electrical Workers		
			Total	Males	Females
1900 .....	....	....	....	....	....
1919	21.0	31.3	208.5	188.5	2,663.8
1920	14.9	9.0	93.9	89.9	145.5
1930	16.1	17.3	48.9	47.4	63.6
1930 over 1900..	61.5	68.0	790.3	707.2	11,002.9

The electrical industry is a comparatively new and a rapidly expanding one. The first census decade on record shows an enormous development. This is followed by smaller percentage increases which conceal the actually greater numerical increases in successive decades.

As an industry reaches maturity, the use of labor-saving equipment in it becomes more effective and its output may be greatly increased without employing a proportionately greater number of workers; hence its rate of growth slackens. In the short space of thirty years, the electrical industry grew from almost nothing to a place of such importance that it supplied 53 per cent of the primary power used in manufacturing in 1929.²⁸ This same period of time has seen revolutionary changes in lighting, making night into day for both work and pleasure.

Sex Composition of Electrical Group

The sex composition of the Electrical Workers group is as follows:

²⁸ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, p. 251.

Census	Percentage	
	Males	Females
1900	99.2	0.8
1910	92.8	7.2
1920	90.8	9.2
1930	89.9	10.1

During the decades 1900-1930 the number of females advanced from less than one per cent of Electrical Workers to ten per cent. While both males and females have increased in number, the rate of growth of the female group exceeds that of the male. Practically all female electrical workers are engaged in electrical machine and supply factories; in 1930 they were 38 per cent of that labor force. There are almost no female electricians or electrical workers in power and light plants.

Subgroups within the Electrical Group

The distribution of electrical workers in 1930, excluding common laborers, was as follows:

Subgroup	Number	Percentage
Electricians and Apprentices	284,928	63.1
Electrical Machinery and Supply Factories ...	117,328	26.0
Electric Light and Power Plants	49,269	11.0
Total	451,524	100.1

Electricians and Apprentices

These workers are dependent largely upon building construction and repairs, and probably belong more accurately in the building trades. They are chiefly skilled craftsmen using hand tools. They numbered 284,928 in 1930, and were .23 per cent of the total population, .58 per cent of the total labor force, and 2.1 per cent of the Manufacturing and Mechanical category.

While the fabrication of electrical materials and the invention of special tools greatly increased per-worker productivity in this trade, the expanding over-all demand for electrical installations offset this increased productivity, so that the number of electricians grew substantially in each successive decade. However, the rate of growth seems to have subsided somewhat, approximately 10,000 fewer electricians and apprentices having been added to this group in the years from 1920 to 1930 than in the years from 1900 to 1910. It is still quite a large group and

an expanding labor force, whose numbers are sufficient to cause some impression, but not a major effect, upon the trend of development in the total of gainfully employed.

Electrical Machinery and Supply Factory Workers

This is a rapidly expanding group which reasonably may be expected to increase with the number and variety of electrically operated domestic and commercial appliances manufactured. But it is especially subject to mechanization, which increases productivity without making use of a corresponding increase in number of workers. For example, the output of electric-lamp assembling plants increased 339 per cent from 1920 to 1931, while the number of workers employed in this production actually declined 68 per cent.²⁶

TABLE 78

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE OF PRODUCT PER WORKER IN THE ELECTRICAL MACHINERY APPARATUS AND SUPPLY INDUSTRY, 1899-1929*

		1919				Increase, 1929 over
Number of establishments	581	1,009	1,404	1,802	1,221	
Percentage increase		73.7	39.1	28.2	210.0	
Number of wage earners	42,013	87,256	212,374	328,722	286,709	
Percentage increase		107.7	143.4	54.8	682.5	
Wages per worker*	\$490	\$566	\$1,121	\$1,388		
Percentage increase		15.5	98.1	23.8	183.2	
Value of products per worker*	\$2,200	\$2,538	\$4,700	\$7,000	\$4,800	
Percentage increase		15.3	85.2	49.0	218.1	

* United States Department of Commerce, Bureau of Census, *Biennial Census of Manufactures, 1931* p. 959. The table reports all workers, whether skilled, semiskilled, or unskilled, actually employed in this industry.

* Figures computed. Radios and phonographs were reported separately after 1929. With these excluded, the number of establishments in 1937 was 1,435 and of wage earners 257,660 (*Biennial Census of Manufactures, 1937*, Preliminary Report, "Wage-Earners," p. 12).

The number of workers employed in electrical machinery and supply factories in 1930 was 117,327, or .1 per cent of the total population, .24 per cent of the gainful labor force, and .86 per cent of the Mechanical and Manufacturing category. While the trend of development indicates an expansion in both

²⁶ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, p. 108.

actual number and in comparison with the trends evidenced in the entire Electrical group, of which this is one subgroup, such electrical workers are not a large enough group to make any appreciable shift among the total of gainfully employed.

Table 78 gives pertinent data on the development of the electrical machinery apparatus and supply industry.

The table shows that wages per worker employed in the electrical industry kept pace with the increased value of products per worker from 1899 to 1909, were even higher in 1919 during the unusual war-time period, but declined markedly in the years from 1919 to 1929. For the entire period 1899-1929 the wage per worker increased 183 per cent, whereas the value of products per worker increased 218 per cent.

Radio Production

Establishments engaged in manufacturing radios numbered 200 in 1936, with nearly 60,000 employees.²⁷ In 1930 only 12 millions, or 40 per cent, of the 29 million families owned a radio; in 1937 the percentage had risen to 82. In addition, radios had been made for 6 million automobiles. Evidently new homes cannot be counted upon to keep the radio industry going; but the automobile radio has at least 20 million possible customers. Another field yet to be supplied is that of farm homes which have hitherto been unsupplied with electrical power. Electrification programs by both government and private utilities will mean an expansion of this market. It is stated that, in January 1938, 17 states were less than 75 per cent supplied. An additional reason for the maintenance of the industry is the short life of radio sets and the rapid advances in design. Short-wave sets are in growing demand.

On the whole, the radio industry seems not to be declining—having sufficient prospective markets to maintain employment at its present level at least—unless unforeseen technological changes and new developments throw out large numbers of workers. Mechanization is the basis of the modern radio industry.²⁸

²⁷ A 3.8 per cent decline in employment had occurred by 1937 (*Statistical Abstract of the United States, 1938*, p. 328).

²⁸ From "Radio Industry," *Occupations, A Series of Vocational Studies, 1938*, NYA of Illinois (W. J. Campbell, State Director), pp. 5, 18. See also *The Labor Force of the Philadelphia Radio Industry*, WPA National Research Project, Report No. P-2, April 1938.

Electric Light and Power Plant Workers

The labor force other than common labor required to man the light and power plants supplying commercial, manufacturing, and domestic light and power totaled 49,269 in 1930. It comprised .04 per cent of the total population, .1 per cent of all gainful workers, and .36 per cent of the Manufacturing and Mechanical category. Despite the fact that the operations which develop and distribute electrical energy are fast undergoing mechanization and being made nearly automatic, this group of electrical workers has grown rapidly.

TABLE 79
COMPARISON BETWEEN ELECTRICITY PRODUCED AND NUMBER OF WORKERS
USED, 1912-1929*

Census	Billion Kilowatt Hours		Electric Plant Workers	
	Number	Percentage Increase	Number	Percentage Increase
1912.....	17.572	....	8,880	....
1919.....	38.921	121.5	15,949	79.6
1929.....	97.352	146.5	49,269	208.9
1929 over 1912....	78.366	446.0	40,389	454.8

* "Public Utility," "Electric Plants," *Commerce Year Book, 1930*, United States Department of Commerce, Bureau of Foreign and Domestic Commerce, I, 271. The number of billion kilowatt hours produced declined from 1929 to the year 1932, and increased thereafter to 121,050 billion in 1937. With 1929 at 100, employment index fell to 78.8 in 1933 and rose to 95.6 in 1937. (*Statistical Abstract of the United States, 1938*, pp. 331, 348.)

The rapid extension of electrical light and power is revealed partly by the figures in Table 79. The 446 per cent increase in billion kilowatt hours produced from 1912 to 1929 does not represent capacity production, for many plants are so well equipped that they can produce, if required, a much greater amount of electricity without adding to plant equipment, or augmenting their labor force appreciably. Yet, the installation of electrical plant facilities during the years under review required a large increase in the labor force. Once fully installed, plants with capacity considerably beyond ordinary use may be expected to require fewer workers in comparison with additional output.

While the number of workers in electric light and power plants has increased rapidly, the group is so small that such increases actually alter very little the total labor force of the nation. It is true that the increased use of electric light and

power gives employment to many workers both on the construction job itself and in factories which supply the materials for construction. But when once these systems are installed, electric light and power plants use relatively few additional workers in proportion to added output.

D. LUMBER AND FURNITURE INDUSTRIES

General Characteristics (Tables 80 to 84)

Certain manufactures which are dependent upon the use of lumber have been grouped together in the census as the Lumber and Furniture Industries. The census lists Cabinetmakers, Coopers, Sawyers, and Upholsterers separately, however, under the category, Manufacturing and Mechanical. They have been reclassified in this study and included in Lumber and Furniture. This group of somewhat similar occupations has experienced a substantial growth, from 177,839 workers in 1870 to a maximum of 376,860 in 1900. In 1930 it numbered 334,217 and its composition was as follows:

Group	Percentage
Cabinetmakers	17.3
Coopers	3.4
Furniture Factories	22.5
Piano and Organ Factories.....	2.4
Sawyers	10.8
Saw and Planing Mills.....	17.6
Upholsterers	15.4
Other Woodworkers	10.5
Total	99.9

The total number of skilled workers in wood and of semi-skilled operatives in woodworking factories increased 199,021 in the thirty years from 1870 to 1900 but decreased 42,643 in the thirty years from 1900 to 1930. This diminution occurred during the period of greatest population expansion and during a time when an enormously increased amount of lumber and furniture was produced. The trends of each subgroup, and their determinable causes will be treated separately in this chapter. How the total group has developed in comparison with the total population and total of gainful workers is shown in Table 84.

TABLE 80

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN LUMBER AND FURNITURE INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Cabinetmakers	{ 42,835 24.1	50,654 21.4	35,915 10.4	35,619 9.5	41,892 14.0	45,511 15.3	57,597 17.8
Upholsterers	{ 6,111 8.4	10,443 4.4	25,066 7.4	30,821 8.2	20,221 6.8	29,605 10.0	51,452 15.4
Furniture Factories .....	{ ..... .....	..... .....	..... .....	..... .....	44,640 14.9	55,717 18.8	75,235 22.5
Piano and Organ Factories .....	{ ..... .....	..... .....	..... .....	..... .....	18,953 6.3	19,852 6.7	8,177 2.4
Other Woodworkers	{ 22,066 12.4	30,337 12.8	68,151 28.4	111,566 29.6	38,618 12.9	35,330 12.1	35,069 10.5
Coopers	{ 43,647 24.5	53,199 22.4	47,486 13.7	37,200 9.9	25,299 8.5	19,066 6.4	11,347 3.4
Sawyers .....	{ ..... .....	..... .....	..... .....	..... .....	43,276 14.5	33,309 11.4	86,064 10.8
Saw and Planing Mills	{ 63,180 35.5	92,357 39.0	138,678 40.1	161,624 42.9	66,060 22.1	57,320 19.3	58,986 17.6
Total	{ 177,339 99.9	236,990 100.0	345,896 100.0	376,860 100.1	298,959 100.0	296,710 100.0	334,217 99.9

TABLE 81

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN LUMBER AND FURNITURE INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Cabinetmakers	{ 42,123 23.9	50,174 21.4	35,891 10.6	35,552 9.7	41,884 14.8	45,503 16.5	57,890 18.5
Upholsterers	{ 5,905 3.3	9,901 4.2	23,918 7.1	28,663 8.8	18,928 6.7	27,338 9.9	49,097 15.7
Furniture Factories .....	{ ..... .....	..... .....	..... .....	..... .....	40,936 14.4	48,906 17.7	66,131 21.2
Piano and Organ Factories .....	{ ..... .....	..... .....	..... .....	..... .....	17,400 6.1	16,949 6.1	7,535 2.4
Other Woodworkers	{ 21,749 12.3	29,334 12.5	92,053 27.3	104,791 28.5	32,304 11.4	30,208 11.0	27,806 8.9
Coopers	{ 43,614 24.7	53,199 22.6	47,488 14.0	37,067 10.1	25,292 8.9	19,061 6.9	11,347 3.6
Sawyers .....	{ ..... .....	..... .....	..... .....	..... .....	43,257 15.2	33,300 12.3	35,984 11.5
Saw and Planing Mills	{ 63,061 35.7	92,316 39.3	138,386 41.0	161,251 43.9	63,684 22.4	54,016 19.6	56,389 18.1
Total	{ 176,452 99.9	234,924 100.0	337,686 100.0	367,344 100.0	293,685 99.9	275,781 100.0	312,179 99.9

TABLE 82

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS IN LUMBER AND FURNITURE INDUSTRIES

Group	1870	1880	1890	1900	1910	1920	1930
Cabinetmakers	{ 712 51.3	480 23.2	24 .3	67 .7	8 .1	8 ^a	7 ^a
Upholsterers	{ 206 14.9	542 26.2	1,748 21.3	2,158 22.7	1,293 8.5	2,267 10.8	2,355 10.7
Furniture Factories .....	{ .... ....	.... ....	.... ....	.... ....	3,704 24.3	6,811 32.5	9,104 41.3
Piano and Organ Factories	{ .... ....	.... ....	.... ....	.... ....	1,553 10.2	2,908 13.9	642 2.9
Other Woodworkers	{ 317 22.9	1,003 48.5	6,098 74.3	6,805 71.5	6,314 41.3	5,622 26.9	7,253 32.9
Coopers	{ 33 2.4	.... ....	48 .6	113 1.2	7 ^a	5 ^a	........
Sawyers .....	{ .... ....	.... ....	.... ....	.... ....	19 .1	9 ^a	80 .4
Saw and Planing Mills	{ 119 8.6	41 2.0	292 3.6	373 3.9	2,376 15.6	3,304 15.8	2,597 11.8
Total	{ 1,387 100.1	2,066 99.9	8,210 100.1	9,516 100.0	15,274 100.1	20,929 99.9	22,038 100.0

Less than .1 per cent.

TABLE 83

WORKERS IN LUMBER AND FURNITURE INDUSTRIES: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.461	.473	.552	.496	.325	.281	.272
All gainful workers, male and female	1.422	1.363	1.521	1.296	.783	.713	.684
All in Manufacturing and Mechanical In- dustries	5.134	4.499	4.899	4.162	2.843	2.382	2.454
[Males of]							
All male gainful workers	1.654	1.593	1.794	1.546	.943	.834	.820
All males in Manu- facturing and Mechi- cal Industries	5.713	5.136	5.647	4.820	3.262	2.619	2.660
[Females of]							
All female gainful workers .....	.075	.078	.210	.179	.189	.245	.205
All females in Manu- facturing and Me- chanical Industries ..	.370	.298	.759	.664	.840	1.084	1.168

TABLE 84

PERCENTAGE CHANGES IN THE TOTAL POPULATION, IN THE TOTAL GAINFULLY EMPLOYED, AND IN THE TOTAL LUMBER AND FURNITURE GROUP, 1870-1930

Census	Total Population	Total Gainfully Employed	Total of Woodworkers
1870 .....	.....	.....	.....
1880	+30.1	+39.1	+33.3
1890	+24.8	+30.7	+46.0
1900	+21.4	+27.9	+ 9.0
1910	+21.0	+31.3	-20.7
1920	+14.9	+ 9.0	- 0.8
1930	+16.1	+17.3	+12.6
1930 over 1870.....	+218.4	+290.5	+87.9

The number of workers in the Lumber and Furniture group increased at a more rapid rate than did the total population or the total gainful workers from 1880 to 1890, but has either failed to keep pace with or has actually fallen behind these two groups in all other census periods. The number in the national labor force increased over three times as fast as the number in Lumber and Furniture in the sixty-year period; the total population increased about two and one-half times as rapidly. This does not mean that the labor force used in making wood products has been inadequate to meet the needs of our growing population. On the contrary, more furniture is manufactured today than fifty years ago when the rate of growth of the Furniture Operatives group exceeded the rate of growth of the total population. Productivity has been multiplied by the use of modern machinery until there is little comparison between the amount of production per worker now and that of a half-century ago. In the ten-year period 1919-1929 the output per man-hour of employment in furniture factories increased 27.3 per cent.²⁹

The total number of workers in Lumber and Furniture made up .27 per cent of the population in 1930, .68 per cent of the total gainfully employed, and 2.45 per cent of all workers in the Manufacturing and Mechanical group. In comparison with the growth of the national labor force, this group has had an erratic career, advancing from 1.3 per cent of all gainful workers in 1880 to 1.5 per cent in 1890, and declining in the period thereafter. Thus, despite the increase in the 1920-1930 decade, operatives in lumber and furniture indus-

²⁹ *Production, Employment, and Productivity*, Part II, WPA National Research Project, Report No. S-1, 1939, Washington, D.C., p. 79.

tries and craftsmen in woodworking trades were of less significance in the total labor force at the end of it than at any previous census in the entire sixty years. In 1870 such workers comprised over 5 per cent of all manufacturing and mechanical workers, while in 1930 they formed less than half of that percentage.

Sex Composition of Lumber and Furniture Group

The sex composition of this group is as follows:

Census	Percentage	
	Male	Female
1870	99.2	.8
1880	99.1	.9
1890	97.6	2.4
1900	97.5	2.5
1910	94.9	5.1
1920	92.9	7.1
1930	93.4	6.6

The number of females engaged in these industries has increased in each successive decade since 1870. The same has not been true of males. The 1910 records showed an appreciable decline from the number of males in 1900, another decrease in 1920, and a sharp increase in 1930. No female coopers were listed in the 1930 census and very few women were cabinetmakers and sawyers. Women were employed principally in furniture factories, sawing and planing mills, upholstering establishments, and a variety of other smaller wood-using factories. However, it is probable that, as the nature of the work itself becomes more highly mechanized, females engaged in these trades will increase in number.

Cabinetmakers

One of the dominant subgroups is that of Cabinetmakers. Large numbers of these workers are found in certain industries, such as automobile and furniture factories and the building and construction industry, and some are scattered throughout a wide variety of industries. Many individual cabinetmakers operate independently throughout the nation. Some have acquired their craft in furniture factories; others have come into it through carpentry.

These craftsmen numbered 57,897 in 1930, the largest number recorded during the previous sixty years. In 1880 they totaled 50,654, declined in 1890 to 35,915, decreased slightly in

1900, and increased in the three successive decades thereafter. The number of cabinetmakers has not grown in proportion to the increase in population, for in 1880 they were .1 per cent of the nation's inhabitants but declined in 1900 to .04 per cent thereof. From 1900 to 1930 they remained at that level. While the number of cabinetmakers may continue to increase as population grows, the probable number required will still be too small to affect seriously the general trend in development of the total gainfully employed.

Upholsterers

Upholsterers, like cabinetmakers, work in a wide variety of industries. Some factories offer steady employment to large numbers, while many others require the services of only a limited number of these workers. Upholsterers engaged in skilled activities partake of both cabinetmaking and textile-using operations. Upholsterers numbered 51,452 in the census of 1930, which was the largest number in this group in the previous sixty years.

In comparison with development of the total of gainful workers, the Upholsterers group increased more rapidly from 1870 to 1890, diminished slightly in 1900, dropped sharply in 1910, and increased from 1910 to 1930. However, the proportion of upholsterers in the national labor force in 1930, .1 per cent, was less than in 1890.

These craftsmen have assumed ever greater importance in Lumber and Furniture, having advanced from 3.4 per cent of that group in 1870 to 15 per cent in 1930. It is probable that their number has not yet reached a maximum and that the decades immediately ahead will record more such workers. But because of their small numbers it is unlikely that even a sharp increase will be sufficient to influence greatly the development of the total of gainfully employed.

Furniture Factories

The census has segregated furniture-factory operatives since 1910. Their number increased substantially in the decades 1910-30, with 75,235 listed in 1930. In that year they were .15 per cent of the total of gainful workers, having made a gain of .04 per cent since 1910. Thus, though increasing in numbers, furniture-factory operatives do not constitute a very large portion of the national labor force.

Here again, the output of the factory has been multiplied proportionately more rapidly than the number of workers used. The various types of labor-saving machinery installed since 1910 have resulted in almost complete automatic handling and cutting of materials; carving, molding, and boring machines have been perfected; power saws, planers, lathes, and sanding machines have been installed in most factories. Nevertheless, the variety of operations followed in making furniture, the fitting and joining necessary, still require the use of operatives, although their activities have been made more uniform and the amount of furniture they can turn out has been greatly increased. For example, the most efficient machines used in furniture carving have reduced the number of workers required in certain operations³⁰ from ten to one. Heavy types of double surfacers used in 1904 had a capacity of 40 lineal feet per minute; by 1924 improvements in such machines had resulted in an average 200 to 250 feet per minute. The addition of feeding tables has made it possible to operate this very efficient machine with the help of but one man. The same labor force required to produce 25 lineal feet per minute of molding in 1904, could produce from 35 to 200 lineal feet per minute in 1924 because of changed machinery. Fortunately, a greatly expanded effective demand made it possible not only to maintain the labor force from 1910 to 1930 but actually to increase it.³¹ If this demand for furniture could be stimulated, there is a probability that the labor force would steadily enlarge even though mechanization should further increase the productivity per worker employed. An authority states:

The need of the American people for more furniture is practically insatiable. No one has ever plumbed its depths. . . . Not only do the thirty million homes in the country require vast quantities of new and "replacement" furniture, but schools, churches, libraries, hospitals, theaters, offices, airplanes, trains, boats and so forth need . . . furniture to carry on their daily activities. It is a truly surprising situation that the general public spends four or five times as much on automobiles as for home furnishings.

It is apparent that ability to pay is a determining factor . . . The furniture industry, on the whole, while a stable and essential one has apparently been unable . . . to keep pace with some of the newer industries.³²

³⁰ Harry Jerome, *Mechanization in Industry*, p. 110.

³¹ The effects of the depression are indicated in Table 54, above.

³² "Furniture Industry," *Occupations, A Series of Vocational Studies*, 1938, NYA of Illinois (W. J. Campbell, State Director), p. 26.

Piano and Organ Factories

The census has segregated operatives in piano and organ factories for the years since 1910, recording the number of these workers as 18,953 in 1910 and 8,177 in 1930. From other sources it has been possible to compile important data for this industry since 1909; these figures on number of workers include all wage earners employed in piano and organ factories. Tables 85 and 86 give the essential data.

TABLE 85

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE PIANO INDUSTRY, 1909-1929*

Group	1909	1919	1929	Change, 1929 over 1909
Number of establishments.....	294	191	81	- 213
Percentage change .....	....	+35.0	-57.6	- 72.4
Wage earners	25,497	22,957	9,970	-15,527
Percentage change .....	....	-10.0	-56.6	- 60.9
Wages per worker.....	\$ 617	\$1,110	\$1,404	+ \$787
Percentage change .....	....	+80.0	+26.5	+127.5
Value added by manufacture per worker	\$1,323	\$2,296	\$2,371	+\$1,048
Percentage change .....	....	+73.5	+ 3.3	+ 79.1

* United States Department of Commerce, Bureau of the Census, *Census of Manufactures, 1929, II, 1327*. Figures per worker computed. By 1937 the number of establishments had declined to 38 and the number of wage earners to 5,698 (*Biennial Census of Manufactures, 1937, preliminary report, "Wage-Earners," p. 20*).

TABLE 86

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE ORGAN INDUSTRY, 1909-1929*

Group	1909	1919	1929	Change, 1929 over 1909
Number of establishments.....	86	68	62	- 24
Percentage change .....	....	-20.9	- 8.8	- 27.9
Wage earners	2,383	1,941	2,389	+ 6
Percentage change .....	....	-18.5	+23.1	+ 3
Wages per worker.....	\$ 599	\$1,019	\$1,508	\$ 913
Percentage change .....	....	+70.2	+48.1	+152.0
Value added per worker...	\$1,268	\$1,934	\$3,445	\$2,177
Percentage change .....	....	+52.5	+78.1	+171.7

* United States Department of Commerce, Bureau of the Census, *Census of Manufactures, 1929, II, 1327*. Figures per worker computed. By 1937 the number of establishments had declined to 34 and the number of wage earners to 1,086 (*Biennial Census of Manufactures, 1937, preliminary report, "Wage-Earners," p. 20*).

Piano manufacture has been the predominant user of labor, employing 64 per cent of all workers engaged in making pianos and organs in 1929. During the twenty years from 1909 to 1929 the number of piano factories decreased almost three-fourths, and the number of wage earners declined 61 per cent. The average full-time pay per worker employed was \$1,404 at the height of economic prosperity in 1929.

The number of organ factories declined 28 per cent from 1909 to 1929; the number of wage earners remained stationary. The circumstances of wage earners employed, as judged by money wages, increased perceptibly, but even so they did not receive a proportionate share of the increased value added by manufacture. Organ making has become a specialized form of labor, using relatively few workers, whose average full-time earnings in 1929 were \$1,508.

Factories making materials used in manufacturing pianos and organs also declined sharply in number from 1909 to 1929 (47 per cent); wage earners declined 70 per cent; and the average full-time earnings of workers in 1929 was \$1,164.

The future of the piano- and organ-making industry is quite precarious; further declines in the number of workers are probably imminent.

Operatives in Other Woodworking Factories

The number of operatives in small wood-manufacturing plants totaled 35,059 in 1930 and made up .07 per cent of the total gainfully employed—their smallest proportion of the national labor force during the sixty years under review. Judging by the trend, especially since 1910, there is little likelihood of these workers assuming any greater importance in the nation's supply of workers, and some probability that they will decline still further.

Coopers

These craftsmen make barrels for the storage of many kinds of liquids, principally wine, beer, and other liquors. The number of coopers, therefore, reflects both the public policy with respect to the manufacture and sale of beverages, and the change in use of containers for storage of liquids, whether bottles, cans, or casks. The number of coopers advanced from 43,647 in 1870 to a maximum of 53,199 in 1880, then declined in each decade until 1930 when only 11,347 coopers were listed

in the census. Part of this decrease antedates Prohibition. The first decided drop occurred from 1890 to 1900. Prior to 1900 a large percentage of flour was packed in barrels but shortly after 1900 the use of barrels was discontinued. Substitutes for coopered barrels probably account for most of the loss in the number of coopers.

While some revival has been noted in the trade since repeal of the Prohibition Amendment, it is unlikely that barrel manufacture will ever again assume the importance of former years. This is especially true because of the prevailing use of metal barrels for beer and other commodities and the perfecting of machinery for quantity production of more durable metal barrels and containers.

In 1930 coopers comprised only .02 per cent of the total of gainful workers, having declined in their proportion of that body in each decade from 1870 to 1930.

Sawyers

Wood sawyers who prepare lumber for use have been segregated in the census since 1910. Prior to that date they were included with other workers in saw and planing mills. Their number in 1930 was 36,064, which was somewhat more than in 1920 but considerably less than in 1910. In this occupation labor-saving machinery has resulted in increased per-worker productivity during the twenty years prior to 1930. Most of the skilled operations which characterized the work of sawyers in former days have given way to semiautomatic machines with sawyers rendering semiskilled machine-tending service.

In comparison with the development of the total of gainful workers, sawyers have not kept up with the rate of growth of that group, in which they were .11 per cent in 1910 and only .07 per cent in 1930. With more efficient power-driven machinery being installed the process of degrading sawyers is well under way; the output per man is increasing too rapidly for even an enlarged market demand to use a working force as great as was formerly required. The result would seem to be an actual decline in this group, with the number of sawyers leveling off, probably at about, or even below, the 1930 figure, and remaining there for some time. At all events, there is no indication, either in the trends of sawyers depicted in the census or in industrial history and present economic

conditions which would encourage optimism concerning their numerical increase in the immediate future.

Saw and Planing Mills

The fabrication in saw and planing mills of many things used in construction and repair of buildings has grown rapidly in the years since the turn of the century. Factory construction is now general in the making of doors, sashes, flooring, wall-boards of several kinds, shiplap and tongue-and-groove lumber, cabinetwork of many sorts, wooden and composition roofing, moldings, and many other articles. It is not uncommon for special orders to be placed with factories for all such articles needed in large construction jobs. These sawing and planing mills were formerly, in the premachine days, dotted over the country, one or more in almost every small town. Now, because of the costly machinery required and the relative ease of transporting even bulky products, these mills have been greatly reduced in number but vastly developed in size and amount of production.

Operatives in saw and planing mills in 1930 totaled 58,986. The number in 1930 was slightly more than in 1920 but less than in any other recorded census. This occurred despite the greatly increased output of planing-mill products as reflected in the curve of building permits given above under Building Trades.

The census trends also reflect the introduction of saw- and planing-mill machines. A large Western mill, for example, has reduced its labor force from over 600 to slightly more than 200 in the period of twenty years after 1906, while the output of the mill in question has increased somewhat.²² The great advances in labor-saving, power-driven machinery have been made since the turn of the century. Likewise the industrial concentration, which has eliminated many small mills, has taken place during the same period of time.

While neither of these influences has produced its ultimate effect—for more labor-saving equipment is being installed and merging of planing mills is continuing—it is probable that the trend since 1900 indicates that the “tapering off” which usually follows revolutionary modern technological changes in an industry is taking place. In the event of an expanding

²² Circumstances known intimately by one of the writers.

building industry it is likely that such substitutes as steel window frames will continue to supplant millwork. It is hardly probable, however, barring a shift so drastic as to provide an appreciable part of new housing fabricated of metal and glass, that the activities of saw and planing mills will be greatly or immediately curtailed.

Saw- and planing-mill operatives were .12 per cent of the total gainfully employed in 1930, their smallest proportion during the previous sixty years.³⁴

E. CLAY, GLASS, AND STONE WORKERS

General Characteristics (Tables 87 to 91)

This group of skilled workers and operatives totaled 122,498 persons in 1930, and constituted .9 per cent of the labor force listed under the Mechanical and Manufacturing group. In addition, 145,665 common laborers were listed in these industries in 1930.³⁵ The relative importance of the sub-groups which comprised Clay, Glass, and Stone in 1930 was as follows:

Group	Percentage Excluding Laborers	Percentage Including Laborers
Glassworkers	36.0	27.0
Stonecutters and Workers in Marble and Stoneyards	25.2	26.9
Potters and Pottery Workers.....	19.0	14.5
Brick, Tile, and Terra-Cotta Workers....	10.5	18.7
Lime, Cement, and Artificial-Stone Work- ers	9.3	12.8
Total	100.0	99.9

There have been many alterations in the composition of this group during the six decades under review. At their peak period brick and terra-cotta workers made up almost 40 per cent of this group; glassworkers at their peak made up 46 per cent; marble workers and stonecutters at one time constituted 39 per cent; lime, cement, and artificial-stone workers

³⁴ On the last two topics, see M. G. Carbone, "Economic Difficulties in the Lumber Industry of the United States, 1850-1932," Ph.D. dissertation, Columbia University, New York City, May 1937, pp. 27 ff.

³⁵ See the discussion of laborers in the section on the Administrative and Service group in Manufacturing Industries, p. 166, above.

TABLE 87

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN CLAY, GLASS, AND STONE INDUSTRIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Brick, Tile, and Terra-Cotta Workers	26,070 39.2	36,052 38.3	60,214 35.3	49,933 29.3	13,407 9.6 (77,954) (31.0)	9,987 8.6 (48,636) (24.3)	12,884 10.5 (59,543) (27.0)
Glass Factories and Glass Blowers	9,518 14.3	17,934 19.1	34,282 20.1	49,998 29.3	57,441 41.0 (24,634) (27.8)	53,975 46.3 (28,937) (34.4)	44,121 36.0 (28,108) (26.9)
Stonecutters and Workers in Marble and Stoneyards	25,881 38.9	32,842 34.9	61,070 35.8	54,460 31.9	44,270 31.6 (6,915) (17.4)	27,645 23.7 (5,084) (13.6)	30,851 25.2 (8,102) (14.5)
Lime, Cement, and Artificial-Stone Workers ....	..... ..... ..... ..... .....	..... ..... ..... ..... .....	..... ..... ..... ..... .....	..... ..... ..... ..... .....	8,609 6.1 (36,083) (15.2)	7,633 6.5 (30,051) (15.6)	11,395 9.3 (38,634) (18.7)
Potters and Pottery Workers	5,060 7.6	7,233 7.7	14,928 8.8	16,140 9.5	16,259 11.6 (9,240) (8.6)	17,437 14.9 (11,836) (12.1)	23,247 19.0 (11,278) (12.9)
Total	66,479 100.0	94,061 100.0	170,494 100.0	170,531 100.0	139,986 99.9 (154,826) (100.0)	116,677 100.0 (124,544) (100.0)	122,498 100.0 (145,665) (100.0)

* Figures in parentheses represent laborers; percentages in parentheses include laborers.

reached their peak in 1930 at approximately 9 per cent of the group; potters, likewise, reached their place of greatest numerical importance in 1930, when they comprised 19 per cent of the total of the Clay, Glass, and Stone group.

In these shifts are to be found the result of the interplay of economic and social factors which have influenced the trends with respect to these workers. The classification is, however, a more or less arbitrary arrangement, with little regard to the essential unity of the subgroups or their dependence upon common economic elements. For example, there is no close affinity in terms of either occupational tasks or nature of output between glass blowers and stonecutters. On the other hand, brick, stone, and artificial-stone workers are making products which are frequently full substitutes for each other. As the goods these workers produce are somewhat more dependent upon the trends in building and construction

TABLE 88

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE CLAY, GLASS, AND STONE INDUSTRIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Brick, Tile, and Terra-Cotta Workers	25,906 39.3	35,984 38.8	60,070 36.1	49,455 30.1	12,649 9.7 (77,333)	9,357 9.0 (48,099)	11,535 10.8 (58,792)
Glass Factories and Glass Blowers	9,345 14.1	17,370 18.7	32,572 19.6	47,377 23.8	53,401 40.9 (23,686)	46,691 45.1 (26,461)	38,763 34.4 (26,362)
Stonecutters and Workers in Marble and Stone-yards	25,831 39.1	32,842 35.4	61,012 36.6	54,317 33.0	44,115 33.8 (6,847)	27,574 26.7 (5,061)	30,840 28.9 (8,097)
Lime, Cement, and Artificial-Stone Workers ....	.....	.....	.....	.....	8,480 6.5 (35,931)	7,428 7.2 (29,384)	11,069 10.4 (38,475)
Potters and Pottery Workers	4,948 7.5	6,644 7.2	12,936 7.8	13,200 8.0	11,785 9.0 (8,641)	12,372 12.0 (10,710)	15,519 15.5 (10,366)
Total	66,120 100.0	92,840 100.1	166,593 100.1	164,349 99.9	130,430 99.9 (152,438)	103,420 100.0 (120,215)	106,726 100.0 (142,095)

* Figures in parentheses represent laborers; percentages in parentheses include laborers.

than are the production of glass or pottery, brick and stone workers are much more closely allied to the building trades than to other members of their own census group. This fact must be kept in mind in proceeding with the discussion of the Clay, Glass, and Stone group.

From .54 per cent of the national labor force in 1880, all these workers advanced to .75 per cent in 1890, and have been declining in each successive decade since then, until in 1930 they were only .25 of all gainful workers. Therefore, with respect to the numerical development of the entire national man power, skilled workers and operatives in Clay, Glass, and Stone are decreasing in importance.

In terms of absolute numbers, such workers increased from 1870 to 1890, held constant in 1900, and declined thereafter. Their number increased in 1930 over that of 1920 but not to a point where they equaled the 1900 or even the 1910

TABLE 89

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS IN THE CLAY, GLASS, AND STONE GROUP, 1870-1930*

Group	1870		1890	1900	1910	1920	
Brick, Tile, and Terra-Cotta Workers	74 20.6	5.6	144 3.7	478 7.7	7.9 (821) (11.5)	4.8 (537) (6.6)	1,349 (751) (10.9)
Glass Factories and Glass Blowers	173 48.2	564 46.2	1,710	2,621 42.4	4,040 42.3 (948) (41.8)	7,284 54.9 (2,476) (55.5)	7,358 46.6 (1,746) (47.1)
Stonecutters and Workers in Marble and Stone-yards			1.5	143 2.3	155 1.6 (68) (1.9)	71 .5 (23) (.5)	11 .1 (5) (.1)
Lime, Cement, and Artificial-Stone Workers ..					129 1.3 (152) (2.4)	207 1.6 (167) (2.1)	326 2.1 (159) (2.5)
Potters and Pottery Workers	112 31.2	48.2	51.0	2,940 47.6	4,474 46.8 (599) (42.5)	5,065 38.2 (1,126) (35.2)	6,728 42.7 (909) (39.5)
Total	359 100.0	1,221 100.0	3,901 100.0	100.0	9,556 (100.1)	13,257 (99.9) (4,329)	15,772 (100.1) (3,570)

* Figures in parentheses represent laborers; percentages in parentheses include laborers.

TABLE 90

WORKERS IN THE CLAY, GLASS, AND STONE GROUP: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930*

	1870	1880	1890	1900	1910	1920	1930
Total population.....	.172	.188	.272	.224	{ .152 (.320)	.110 (.228)	.100 (.218)
All gainful workers, male and female.....	.531	.541	.750	.587	{ .367 (.772)	.280 (.580)	.251 (.549)
All in Manufacturing and Mechanical Industries	1.919	1.786	2.415	1.883	{ 1.331 (2.804)	.937 (1.936)	..... (1.969)
[Males of]							
All male gainful workers .....	.620	.630	.885	.692	{ .433 (.940)	.313 (.676)	.280 (.653)
All males in Manufacturing and Mechanical Industries	2.141	2.030	2.786	2.156	{ 1.500 (3.253)	.982 (2.124)	.909 (2.120)
[Females of]							
All female gainful workers .....	.020	.046	.100	.116	{ .118 (.148)	.155 (.206)	.147 (.180)
All females in Manufacturing and Mechanical Industries..	.096	.176	.361	.431	{ .526 (.657)	.687 (.911)	.836 (1.025)

Percentages in parentheses include laborers.

force. During the thirty years from 1870 to 1900 the numerical increase was 104,052; during the thirty years from 1900 to 1930 there was a decline of 58,033 workers. The percentage increase is indicated in Table 91.

TABLE 91

PERCENTAGE CHANGES IN THE CLAY, GLASS, AND STONE GROUP COMPARED WITH THAT OF THE TOTAL POPULATION AND THAT OF ALL GAINFUL WORKERS, 1870-1930

Census	Total Population ^a	Total Gainful Workers ^b	Clay, Glass, and Stone Group ^c
1870.....	.....	.....	.....
1880.....	{ + 30.1 (+ 25.9)	+ 39.1 (+ 34.5)	+ 41.5 (+ 41.5)
1890.....	{ + 24.8 (+ 24.8)	+ 30.7 (+ 34.1)	+ 81.3 (+ 81.3)
1900.....	{ + 21.4 (+ 21.3)	+ 27.9 (+ 24.6)	+ 0.02) (+ 0.02)
1910.....	{ + 21.0 (+ 21.0)	+ 31.3 (+ 28.1)	- 17.9 (+ 72.9)
1920.....	{ + 14.9 (+ 15.0)	+ 9.0 (+ 11.7)	- 16.7 (- 18.2)
1930.....	{ + 16.1 (+ 16.1)	+ 17.3 (+ 17.3)	+ 5.0 (+ 11.2)
1930 over 1870....	{ +218.4 (+208.3)	+290.5 (+277.5)	+ 84.3 (+303.4)

^a Revised percentages according to statistical corrections for 1870, in parentheses.

^b Revised percentages according to statistical corrections for 1870, 1890, 1910, and 1920, in parentheses.

^c Revised percentages, including laborers (see Table 87), in parentheses.

In comparison with the rates of growth in the total population and in the total of gainful workers, the only decades in which skilled workers and operatives in clay, glass, and stone exceeded the rate of growth of either were those ending in 1880 and 1890. Not only did this group fail to keep pace with these major groups thereafter but it sustained a loss in two decades and its ten-year growth from 1920 to 1930 was considerably less than the growth of the total population and of all gainful workers. For the entire sixty-year period, the national labor force increased more than three times as fast as did the skilled workers and operatives in clay, glass, and stone.

The inclusion of common laborers in Clay, Glass, and Stone with the skilled workers and operatives, as indicated by the percentages in parentheses in Table 91, shows quite a different trend for the group as a whole. From 1870 to 1930 the gain in this total family of workers was 303 per cent, which exceeds appreciably either the gain in the total population or in the

total gainfully employed. This would indicate that Clay, Glass, and Stone workers had become proportionately more important numerically in the national economy, in comparison with the general trend of all workers. But the treatment of the two end-points of the sixty-year span conceals the important facts that from 1910 to 1920 the total of the Clay, Glass, and Stone group declined and that in 1930 it increased at a rate slower than that of the total gainfully employed. Thus the trends of recent decades indicate that the Clay, Glass, and Stone group is not keeping pace with the growth of the national labor force.

Sex Composition of Clay, Glass, and Stone Group

The sex composition of this group is as follows:

Census	Percentage*	
	Males	Females
1870.....	99.5	0.5
1880.....	98.7	1.3
1890.....	97.7	2.3
1900.....	96.4	3.6
1910.....	{ 93.2	6.8
	{ (95.9)	(4.1)
1920.....	{ 88.6	11.4
	{ (92.7)	(7.3)
1930.....	{ 87.1	12.9
	{ (92.8)	(7.2)

* Percentages in parentheses include laborers.

Here is portrayed a development that is a conspicuous characteristic of any industry which lends itself to mechanization or to production methods which permit the employment of women. Unlike that of the male workers in the Clay, Glass, and Stone group, the number of females has advanced in each decade of the census. There are practically no females engaged in marble, stone, lime, cement, and artificial-stone establishments; but in 1930 females had advanced to the place where they constituted 16 per cent of all operatives in glass-works, 21 per cent of all pottery operatives, and 10 per cent of operatives in brick, tile, and terra-cotta plants.

Brick, Tile, and Terra-Cotta Workers

Building materials other than wood have been used in much greater quantities since the turn of the century. The

cost of lumber, its inflammable character, and its rigidity have forced the wider adoption of brick, tile, terra cotta, and cement for construction purposes.

The making of clay products requires little ingenuity, so that many localities which have accessible clay banks have developed their own clay kilns. The presence of these many small establishments, the relative simplicity of the manufacturing methods, and the fact that clay products are heavy and transportation costs high all combined to retard introduction of mass-production methods and to prolong the handicrafts in brick, tile, and terra-cotta manufacture.

However, the speeding-up process which took place during the World War brought with it widespread practical use of machine diggers and conveyors and of truck transportation, and made more profitable the concentration of brick and terra-cotta making into larger establishments.⁸⁶ In a study of 35 brickmaking plants operating in 1925, Jerome found that 13 were still using hand wheelbarrows as the only means of conveyance, 18 had fully mechanized the handling of materials, and the other 4 still depended somewhat on hand operations.

Natural heat is being replaced by artificial heat for drying brick and tile, and the tile-molding machines which are being introduced increase the output with a considerable reduction in the number of workers needed. But, on the whole, the mechanization of brick and terra-cotta factories has not yet reached its maximum, nor has the fullest effect of its labor displacement been felt.

Turning to Table 87, an over-all increase in the number of brick, tile, and terra-cotta workers is indicated for the period 1870-1930, from 26,070 to 72,427. But the increase is by no means a constant one. A decided peak was registered for the year 1890 above the numbers for 1870, 1880, and 1900. A similar peak, the highest of the entire series, is indicated for the year 1910 in comparison with the record for the two succeeding decades, and the number for 1920 is less than that of 1890. These figures may possibly indicate a reversal of the general upward trend after 1910.

The number of common laborers declined from 77,954 in 1910 to 59,543 in 1930, a loss of 23 per cent. During the same

⁸⁶ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, pp. 71-80.

twenty-year period the number of operatives was also declining; the combined labor force, common laborers and operatives, having shown a decrease of 20 per cent.

The Brick, Tile, and Terra-Cotta Workers group maintained its relative position in the total national labor force from 1870 to 1880, gained slightly in 1890, and declined thereafter until 1920. It showed a slight increase in 1930 and constituted .148 per cent of all workers (only .007 per cent more than in 1920), and a smaller proportion of all gainful workers than in any census other than 1920. In view of the technological advances now being made in this industry, it is probable that the trend noted in the tables will continue and that if any increase occurs in the number of workers it will be slight.

Glass Factories and Glass Blowers (Tables 92 and 93)

The glassmaking industry is usually divided into four fairly distinct parts, namely, bottles and jars, pressed and blown ware, window glass, and plate glass. The bottles and jars division is of predominant importance in terms of number of workers, capital investment, and value of output, but is closely followed by the pressed- and blown-ware division.⁸⁷

It is probable that no other industry has undergone such revolutionary changes with the introduction of mass production and labor-saving machinery as the glass industry. Fortunate indeed, from the standpoint of the labor force, is the fact that the materials used in glassmaking are relatively very cheap, the resultant product is quite inexpensive, and the market for glassware of many kinds is an expanding one. Had this not been true, even more severe reductions in the number of workers undoubtedly would have been caused by the introduction of semiautomatic or automatic machinery.

The 1930 labor force of skilled workers and operatives totaled 44,121. There were fewer such workers listed in the glass industries in this census than at any time after 1890. The number of common laborers in glass factories increased from 24,634 in 1910 to 28,108 in 1930, a gain of 14 per cent. As the number of skilled workers and operatives declined 13,320, or 23 per cent during this twenty years, not only was there a degrading of workers in the glass industry but an increased

⁸⁷ An excellent account of the glass industry is contained in *Bulletin No. 441*, July 1927, United States Department of Labor, Bureau of Labor Statistics, Washington, D.C.

production was made possible with an actual decline in the number of workers used. Even with respect to unskilled laborers, a decline in number of 829 occurred from 1920 to 1930.³⁸

Skilled glassworkers and operatives comprised .07 per cent of the total gainfully employed in 1870, advanced to become .17 per cent in 1900, and steadily lost ground thereafter until in 1930 they represented only .09 per cent.

These trends have been recorded during the development of an industry which has experienced not only greatly changed methods of production but also an enormously increased output, as recorded in Table 92. This table includes all workers—skilled, semiskilled, and unskilled—actually used in the production indicated, and is therefore more inclusive than the census table just reviewed.

Table 92 shows that the total number of glassmaking establishments declined 26 per cent from 1899 to 1929. Bottle plants and pressed- and blown-ware plants increased. Window-glass plants declined in number. There was no great change in number of plate-glass establishments from 1899 to 1930. Within this aggregation of some three hundred establishments are a few gigantic plants, such as the Libby-Owens-Ford factories and the Corning Glass Works, which dominate the industry, employing most of the workers and manufacturing most of the glass products. For example, a sample study of glass factories in 1933 showed that the six largest concerns, which constituted 3.8 per cent of all concerns, employed 44 per cent of all workers.³⁹

The total labor force engaged in the glass industry was 31 per cent greater in 1925 than in 1899. Wages per worker increased 144 per cent, but the value of the output per worker increased 300 per cent. While this was the case in the glass industry as a whole, the circumstances in each of the several types of glass production varied.

The bottle- and jar-making industry increased the value of its output per worker 505 per cent from 1899 to 1925. But this branch of the industry was subjected to such technological advancement that the greatly increased production and money

³⁸ In 1935 production of glass had increased 6 per cent over 1929 with a decline of 5.5 per cent in employment and the significant increase in man-hour output of 48.5 per cent. See Table 54.

³⁹ See Table 60.

TABLE 92

COMPARISON OF NUMBER OF WORKERS, NUMBER OF ESTABLISHMENTS, AND PHYSICAL PRODUCTION IN THE GLASS INDUSTRY, 1899-1929*

	1899	1909	1919	1925	1929 ^a	Change, 1929 over 1899
<i>Number of establishments</i>	355	363	371	310	263	....
Percentage change .....	....	+ 2.3	+ 2.2	- 16.5	-15.2	- 25.9
<i>Bottles and jars</i>	147	166	145	120	254	....
Percentage change .....	....	+13.7	-12.7	- 17.2	+11.7	+ 74.0
<i>Pressed and blown ware</i>	84	114	130	123	177	....
Percentage change .....	....	+35.7	+14.0	- 5.4	+43.9	+110.7
<i>Window glass</i>	100	....	79	42	20	....
Percentage change .....	....	....	-21.0 ^b	- 46.8	-52.4	- 80.0
<i>Plate glass</i>	16	....	17	19	15	....
Percentage change .....	....	....	+ 6.3 ^b	+ 11.8	-21.1	- 6.2
<i>Average number wage earners</i>	52,818	68,911	77,520	69,371	....	....
Percentage change .....	....	+30.5	+12.5	- 10.5	....	....
<i>Bottles and jars</i>	28,370	....	....	21,704	....	....
Percentage change .....	....	....	....	- 23.5 ^b	....	....
<i>Pressed and blown ware</i>	12,546	....	....	21,507	....	....
Percentage change .....	....	....	....	+ 71.4 ^b	....	....
<i>Window glass</i>	8,682	....	....	8,346	....	....
Percentage change .....	....	....	....	- 3.9 ^b	....	....
<i>Plate glass</i>	3,220	....	....	11,124	....	....
Percentage change .....	....	....	....	+245.5 ^b	....	....

* Bureau of Labor Statistics, *Bulletin No. 441*, July 1927.^a Figures for 1929 taken from *Biennial Census of Manufactures*, United States Department of Commerce, pp. 751-58.^b Figured from last previous decade for which a report is given.

return were achieved with an actual loss of 23 per cent in the number of workers used. Professor G. E. Barnett distinguishes three periods in the revolution which has established these conditions in the bottle and jar factories.⁴⁰ From 1898 to 1905 semiautomatic machinery was used commercially for the manufacture of wide-mouth ware exclusively. From 1905 to 1917 the Owens automatic machine for the making of all kinds of bottles, both wide- and narrow-mouth, was perfected and put into use. Since 1917, the industry has perfected automatic machinery and by the use of continuous feed and flow devices has eliminated much handwork. Machines have been made larger and equipped with many more molds than formerly. Thus while the demand for glass bottles and jars continues to increase, the automatic nature of the machinery used makes

⁴⁰ G. E. Barnett, *Machinery and Labor*, Harvard University Press, 1926.

TABLE 93

AVERAGE WAGE PAID PER WORKER, OUTPUT PER WORKER, AND VALUE OF OUTPUT PER WORKER IN THE GLASS INDUSTRY AND ITS SUBDIVISIONS, 1899-1925*

			1919	1925	Increase, 1925 over
<i>Glass industry</i>					
Value of output per worker....	\$1,067	\$1,337	\$3,378	\$4,269	\$3,202
Percentage increase .....	....	25.3	152.7	26.4	300.0
Average wage per worker	\$ 512	\$ 570	\$1,128	\$1,250	\$ 738
Percentage increase		11.3	98.0	10.8	144.1
<i>Bottles and jars</i>					
Value of output per worker....	\$ 764			\$4,623	\$3,859
Percentage increase				505.2	505.2
<i>Pressed ware</i>					
Value of output per worker....	\$1,361			\$3,352	\$1,991
Percentage increase				146.3	146.3
<i>Window glass</i>					
Value of output per worker....	\$1,253			\$4,496	\$3,243
Percentage increase				258.8	258.8
<i>Plate glass</i>					
Value of output per worker....	\$1,602			\$5,142	\$3,540
Percentage increase				221.0	221.0

* Computed from figures presented in Table 92.

it possible to enlarge the output appreciably without adding substantially to the labor force.⁴¹

The value of output of pressed and blown ware per worker increased 146 per cent from 1899 to 1925, and the labor force 71 per cent. The pressed-ware branch of the industry has not shared to the same extent as bottle and jar manufacture in automatic mechanization. But during the first years of this century the semiautomatic rotary press was introduced and automatic feeding devices were attached to most types of presses. These semiautomatic machines are now used extensively to make general-purpose containers, but in the more complicated designs and higher-priced products many handworkers are still employed. Automatic machinery has almost entirely displaced hand blowers in the making of blown ware.

In lamp-chimney making, hand production has predominated, but recently has given way to machinery. The industry is on a decided decline because even in remote parts of the

⁴¹ Table 54, above, shows that while production of glass containers increased 18.4 per cent from 1929 to 1935, employment increased only 13.2 per cent.

country oil lamps have been replaced by other and superior methods of lighting.

Glass tubing, so necessary in industry, is made by automatic machines, introduced in 1917, which now dominate the field.

There is still room for further inventions to make pressed and blown glassware automatically, and when this change occurs the number of workers per unit of output will be further decreased.

The amount of window-glass production is dependent largely upon the course of building construction. As was noted earlier in this treatise, building operations have a rhythmic cycle of activity and recession, so that it is not unusual for the production of window glass to fluctuate also. In comparing 1899 with 1925 it will be seen that the labor force used in window-glass making decreased 4 per cent, but that the value of output per worker advanced 259 per cent.

Window-glass manufacture has been a comparatively simple process, and small, poorly equipped factories with limited output dotted the country in earlier days. In the past thirty years the number of such establishments has been reduced by more than half, and the newer, larger units have introduced mass-production methods and effected greatly increased output.⁴²

The Lubber cylinder machine, successfully used in 1905, was first to replace the hand process in window-glass making. This, however, was a semiautomatic process and much handling of the material was still required. But in 1917 the Colburn process, in which a continuous sheet of glass could be automatically drawn from a tank, became a commercial success; and in 1921 the Fourcault automatic glassmaking machine was introduced. These two machines are rapidly displacing the older cylinder process, and the day is not far distant when practically all window glass will be made by automatic machines. The work of most of the remaining glassworkers will then be reduced to the semiskilled and unskilled levels of machine tending, with a relatively few mechanics to repair the machines.⁴³

⁴² As shown in Table 54, production of window glass in 1935 was 84.5 per cent of the 1929 production, while employment had decreased 20 per cent.

⁴³ From Table 54 it appears that employment in 1935 decreased to 54.6 per cent of the 1929 level, while production increased 10.8 per cent.

The number of plate-glass workers increased 245 per cent from 1899 to 1925, but the value of the output per worker had increased 221 per cent. From the very beginning of the glass industry the making of plate glass has differed from other forms of glass manufacture; its simple operations have always been performed largely by unskilled laborers. Thus the enormously increased use of plate glass in automobile construction, store windows, and for domestic purposes made it necessary to double the labor force of unskilled workers to meet this production demand. As this labor became higher priced, the tendency toward more automatic types of machinery also grew. The continuous process is being perfected, and machine conveyors, grinders, and polishers are rapidly being improved. All this tends to displace workers.

The average annual income per wage earner employed in the glass industry was only \$512 in 1899.⁴⁴ Twenty-five years later, after machine production had altered the character of the labor force and displaced many of the skills formerly used, the average income per wage earner employed was \$1,250. Thus, for the average worker who was fortunate enough to retain his job in the glass industry during the revolutionary changes occurring in the past quarter of a century, money wages were more than twice as high as in 1899.

However, as the Department of Labor points out, such comparisons of average incomes are of doubtful value, principally because the composition of the two labor forces compared was not similar. In 1899 many glassworkers were children, 13 per cent of the total being boys and girls under 16 years of age who worked for only a few dollars a week. By 1925 the influence of public policy and the adoption of machinery by industry which discarded most of the hand operations done by children resulted in the removal of almost all children from glass factories.

Whereas in terms of money wages the conditions of glass-factory workers had greatly improved despite the technological advances made, the trend of "real wages" tells a different story. The real earnings in 1904, when hand operations still characterized the glass industry, were 21 per cent higher than in 1914 and in that year they were 5.4 per cent above the 1919 level. While the trend has been upward since 1919, reaching

⁴⁴ United States Department of Labor, Bureau of Labor Statistics, *Bulletin No. 441*, July 1927.

in 1925 a point 13 per cent above 1914, real wages in 1930 had not yet equaled the 1899 or 1904 level. So that, with the changes which have revolutionized the production of glass greatly increasing the output but actually reducing the recompense of most of the workers, the average living standards of this labor force did not compare with the standards enjoyed by the hand operators of the premechanized period of the last century.⁴⁵

Technology has completely changed the making of glass, placed a less costly product on the market in much greater quantities, reduced the number of factories, forced out of the industry the handicrafts of the premachine day, brought in a new body of semiskilled and unskilled workers aided by a few skilled machinists, reduced enormously the labor costs per unit of product, and prevented workers in the industry from sharing in proportion with the other claimants in the increased income from accelerated production. This trend in glassmaking is not unique. The same trend is occurring in a growing number of industries as they too become mechanized.⁴⁶

Stonecutters and Workers in Marble and Stoneyards

The use of stone for building materials has met strenuous competition from steel and concrete. The result has been the restriction of stone chiefly for façades and ornamentation. The changing customs of the people with respect to burials have also lessened the demand for gravestones and prevented an expansion in the stone-working industry which would otherwise have accompanied the growth in population.

The number of skilled workers and operatives in marble and stone increased from 25,831 in 1870 to a maximum of 61,070 in 1890, and declined in each decade thereafter until 1920. In 1930, there were 30,851 workers recorded in this group. This sixty-year span covers the period of most intensive building construction and greatest expansion in population. With the exception of the 1920 record, the number in the 1930 census is smaller than in any census after 1870. The 1920 to 1930 gain was 3,206 workers. Common laborers in marble and stone totaled 6,915 in 1910, and increased slightly

⁴⁵ United States Department of Labor, Bureau of Labor Statistics, *Bulletin No. 441*, July 1927.

⁴⁶ A mimeographed publication by S. N. Wilson of the NYA of Ohio (S. B. Weston, State Director) has the title "The Glass Industry in Ohio," July 1938.

to become 8,102 in 1930. In view of the rapid advance in modern methods of handling, cutting and treating, hauling, and erecting heavy stone, and the restricted use of such products, the fact that such a small number of additional workers has been needed in this industry is not surprising.

In comparison with the development of the total of gainful workers, marble and stone workers achieved their greatest significance as .26 per cent of that body in 1890, and declined steadily until in 1930 they made up .06 per cent.

Lime, Cement, and Artificial-Stone Workers

Census data are available for this group since 1910 only. The number of these skilled workers and operatives decreased slightly in 1920 as compared with 1910, but increased substantially in 1930. The group is small—11,395 persons in 1930. At that time it was exactly the same proportion of the total gainfully employed as in 1910, namely, .02 per cent.

Most workers used in this industry are unskilled; common laborers totaled 36,083 in 1910, or 80 per cent of its labor force. By 1930 they had increased to 38,634, but constituted 77 per cent of all workers in this industry. A slight upgrading of the labor force is indicated by these figures.

The production of cement increased from 77,785,000 barrels in 1910 to 172,856,000 in 1929,⁴⁷ a gain of 122 per cent during a period of time when the total available labor force of lime, cement, and artificial-stone workers (only part of which was actually used in that expanded production) increased only 12 per cent.

These figures attest the greater productivity per worker when modern production methods are employed. In view of this fact, it would appear that only a very substantial increase in the demand for cement and its products, sustained over the years without abatement, can result in further additions to the labor force of cement workers.

Fortune in March 1935 declared that there never was a time when cement production capacity was fully employed. In 1934 the industry was almost 70 per cent idle. The relative importance in the uses of cement was reported for 1933 as follows:

⁴⁷ Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, New York, 1934, p. 290. Table 54, above, indicates that while output per man-hour had increased 28.7 per cent from 1929 to 1936, production and employment had decreased practically 33 per cent.

Use	Million Barrels
Road, streets, alleys, gutters, curbs, and pavement.....	20.6
Structural concrete in buildings.....	17.3
Rural use including farm structures.....	7.7
Bridges, river and harbor work, reservoirs, dams, etc.	5.2
Railways, including street railways.....	5.1
Sewerage, drainage, culverts, and specialties.....	4.1
Concrete products except those used on farms.....	2.1
Sidewalks and private driveways.....	1.9
Total	64.0

The biggest market for cement in 1933 was for cement highways, amounting to almost one-third of the total tonnage. Recently government river control and other projects must have made heavy demands upon this product. It is clear that the future of the industry is closely related to government operations and to the development of concrete highways, reference to which is made in the chapter on transportation, below.

Potters and Pottery Workers

Skilled workers and operatives in this group increased from 5,060 in 1870 to their maximum number of 23,247 in 1930. Only in 1900 and 1910 were their numbers fairly stationary, for in all other decades they show an advance. Common laborers have also increased, from 9,240 in 1910 to 11,278 in 1930. This expansion has occurred during the period of greatest mechanization of the pottery industry and reflects the very substantial increase in demand for pottery products, a demand so great as to have caused an over-all increase in the labor force despite the rise in productivity per worker.

Although small potteries still dot the geographic map of the United States, most of the manufacture of potters' ware is concentrated in two great commercial centers in Ohio and New Jersey. The industry has had its natural growth in these areas because they are situated close to both the natural clay banks which furnish their raw material and the congested centers of population which offer a market for their output.

Improved methods of hauling and handling clay, artificial heating of kilns, and automatic and semiautomatic molding machines are gradually displacing many of the handicrafts in the pottery industry. In the finer ware, however, handwork is still in considerable demand, and the industry as a whole cannot be said to have achieved its maximum in the

introduction and use of modern labor-saving equipment. Certain pertinent statistics useful in understanding the trends in pottery workers are displayed below.

TABLE 94

NUMBER OF POTTERY ESTABLISHMENTS, NUMBER OF WORKERS EMPLOYED, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER, 1899-1929*

	1899	1909	1919	1929	Change, 1929 over
Number of establishments...	1,000	822	340	313	- 687
Percentage change		-17.8	- 58.6	- 7.9	- 68.7
Average number of wage earners employed	43,714	56,168	27,934	35,409	-8,305
Percentage change		+28.5	- 50.3	+26.8	- 19.0
Wage per worker	\$405	\$530	\$1,067	\$1,232	\$ 827
Percentage change		+30.8	+101.2	+15.5	+204.1
Value added by manufacture per worker	\$740	\$966	\$1,937	\$2,361	\$1,621
Percentage change		+30.5	+100.5	+12.2	+219.1

* United States Department of Commerce, Bureau of the Census, *Biennial Census of Manufactures, 1931*, p. 738, Table 1. In 1937 the number of establishments had been reduced to 251 and the number of wage earners by 6.6 per cent. *Biennial Census of Manufactures, 1937*, preliminary report, "Wage-Earners," p. 27.

It must be borne in mind that figures for Table 94 are taken from statistics assembled by the government from the factories themselves, and that these figures include all workers engaged in the pottery industry, whether potters, unskilled workers, or machinists. The census figures on occupations, on the other hand, are secured from individual workers, and do not reflect the industrial connection of persons enumerated.

The number of pottery establishments declined 68 per cent from 1899 to 1929; the total labor force connected with the industry likewise experienced a drop of 19 per cent, while the wage per worker increased 204 per cent. However, this represents money wages, and does not indicate the difference in living standards attained by the present group of pottery workers as compared with the standards of those who received the smaller total money income in 1899 to 1929. The value added by manufacture per worker increased 219 per cent. Even in this industry, which still uses much hand skill, the value added by manufacture has had a greater proportionate advance than the wages paid.

F. IRON AND STEEL WORKERS

General Characteristics (Tables 95 to 99, Charts 10 and 16)

The Iron and Steel Workers group within the Manufacturing and Mechanical category consists of automobile factory

TABLE 95

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN IRON AND STEEL, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Machinists, Millwrights, Toolmakers, and Apprentices	{ 61,519 18.6	116,718 25.4	204,813 29.7	311,267 34.4	488,049 38.4	934,125 46.3	774,701 45.0
Molders, Founders, and Casters	{ 1,543 .5	3,341 .7	8,932 1.3	12,473 1.4	120,900 9.5	123,681 6.1	105,158 6.1
Blacksmiths, Forgemen, Hammermen, and Apprentices	{ 142,075 43.0	172,726 37.7	209,581 30.4	226,477 25.0	242,990 19.1	224,082 11.1	148,151 8.6
Boilermakers, Apprentices, and Helpers	{ 6,958 2.1	12,771 2.8	21,339 3.1	33,046 3.6	44,761 3.5	76,093 3.8	50,554 2.9
Furnacemen, Smeltermen, Heaters, Puddlers, etc. ...	{ ..... .....	..... .....	..... .....	..... .....	36,251 2.8	40,806 2.0	35,166 2.0
Rollers and Roll Hands (metals)	{ 2,796 .8	7,170 1.6	12,319 1.8	18,487 2.0	18,407 1.4	25,061 1.2	30,765 1.8
Wagon and Carriage Factory Operatives	{ 20,942 6.3	15,592 3.4	12,856 1.9	13,505 1.5	22,339 1.8	9,430 .5	2,766 .2
Automobile Factory Operatives .....	{ ..... .....	..... .....	..... .....	..... .....	21,091 1.7	121,164 6.0	161,957 9.4
Agricultural Implement Factory Operatives .....	{ ..... .....	..... .....	..... .....	..... .....	4,866 .4	7,722 .4	8,782 .5
Ship- and Boat-building Operatives .....	{ ..... .....	..... .....	..... .....	..... .....	14,530 1.1	97,666 4.8	19,969 1.2
Blast Furnace and Steel Rolling Mill Operatives*	{ ..... .....	..... .....	..... .....	..... .....	70,273 5.5	93,627 4.6	106,642 6.2
Other Iron and Steel and Machinery Factory and Unspecified Metal Operatives ^b	{ 94,790 28.7	130,346 28.4	220,428 31.9	290,538 32.1	188,158 14.8	262,392 13.0	276,800 16.1
Total	{ 330,623 100.0	458,664 100.0	696,266 100.1	905,793 100.0	1,272,615 100.0	2,015,849 99.8	1,721,433 100.0

* Includes tin-plate mills for 1930, 1920, 1910.

^b Includes iron foundries.

IRON AND STEEL WORKERS

223

TABLE 96

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
IRON AND STEEL, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Machinists, Millwrights, Toolmakers, and Ap- prentices	{ 61,411 18.8	116,161 25.5	204,126 29.8	306,950 34.5	487,956 39.1	384,102 47.7	774,675 46.6
Molders, Founders, and Casters (metal)	{ 1,543 .5	3,341 .7	8,912 1.3	12,430 1.4	120,783 9.7	123,668 6.3	105,139 6.3
Blacksmiths, Forgemmen, Hammermen, and Ap- prentices	{ 142,075 43.5	172,726 37.8	209,521 30.6	226,284 25.2	242,957 19.4	224,075 11.4	148,142 8.9
Boilermakers, Apprentices, and Helpers	{ 6,953 2.1	12,771 2.8	21,333 3.1	33,038 3.7	44,761 3.6	76,093 3.9	50,554 3.0
Furnacemen, Smeltermen, Heaters, Puddlers, etc. ...	{ ..... .....	..... .....	..... .....	..... .....	36,226 2.9	40,800 2.1	35,165 2.1
Rollers and Roll Hands (metals)	{ 1,961 .6	6,925 1.5	11,238 1.6	16,701 1.9	18,384 1.5	25,061 1.3	30,765 1.9
Wagon and Carriage Fac- tory Operatives	{ 20,942 6.4	15,592 3.4	12,855 1.9	13,495 1.5	21,255 1.7	8,749 .4	2,517 .2
Automobile Factory Oper- atives .....	{ ..... .....	..... .....	..... .....	..... .....	20,243 1.6	108,376 5.5	142,925 8.6
Agricultural Implement Factory Operatives .....	{ ..... .....	..... .....	..... .....	..... .....	4,494 .4	7,136 .5	8,281 .5
Ship- and Boat-building Operatives .....	{ ..... .....	..... .....	..... .....	..... .....	14,464 1.2	97,175 5.0	19,904 1.2
Blast Furnace and Steel Rolling Mill Operatives ^a	{ ..... .....	..... .....	..... .....	..... .....	67,889 5.4	89,526 4.6	103,575 6.2
Other Iron and Steel and Machinery Factory and Unspecified Metal Op- eratives ^b	{ 91,996 28.1	128,932 28.2	217,515 31.7	287,241 31.9	169,732 13.6	224,196 11.4	239,453 14.4
Total	{ 826,381 100.0	456,448 99.9	685,500 100.0	899,139 100.1	1,249,144 100.1	1,958,957 100.0	1,661,095 99.9

^a Includes tin-plate mills for 1930, 1920, 1910.

^b Includes iron foundries.

TABLE 97

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN IRON AND STEEL, 1870-1930

Group	1870	1880	1890	1900	1910	1920
Machinists, Millwrights, Toolmakers, and Ap- prentices	108 2.9	557 25.1	687 14.4	1,317 19.8	98 .4	
Molders, Founders, and Casters (metal)	{		20 .4	43	117 .5	19
Blacksmiths, Forgemen, Hammermen, and Ap- prentices	{		1.3		33 .1	
Boilermakers, Apprentices, and Helpers			6 .1	.1		
Furnacemen, Smeltermen, Heaters, Puddlers, etc. .					25 .1	
Rollers and Roll Hands (metals)	835 22.3	245 11.1	1,061 22.7	1,786	.23 .1	....
Wagon and Carriage Fac- tory Operatives	{				1,084 4.6	681 1.2
Automobile Factory Oper- atives	{				848 3.6	12,788 22.5
Agricultural Implement Factory Operatives					372 1.6	586 1.0
Ship- and Boat-building Operatives					66 .3	491 .9
Blast Furnace and Steel Rolling Mill Operatives ^b					2,384 10.2	4,101 7.2
Other Iron and Steel and Machinery Factory and Not Specified Metal Op- eratives ^c	{ 2,794 74.7	1,414 63.8	2,913 61.1	3,297 49.5	18,426 78.5	38,196 67.1
Total	{ 3,742 100.0	2,216 100.0	4,768 100.0	6,654	23,471 100.0	56,892 99.9

^a Less than .001 per cent.^b Includes tin-plate mills for 1930, 1920, 1910.^c Includes iron foundries.

hands, steel and iron mill hands, shipbuilders, operatives in machinery factories, as well as implement makers, blacksmiths, forgemen, machinists, and molders. This group numbered 330,623 workers in 1870, increased to a peak of 2,015,849 in 1920, but by 1930 had declined to 1,721,433 workers. In that year it made up 12.6 per cent of all the Manufacturing and Mechanical group, 1.4 per cent of the total population, and 3.5 per cent of the total of gainful workers.

The number of blacksmiths, boilermakers, machinists, and shipbuilders declined markedly from 1920 to 1930, a decline

TABLE 98

WORKERS IN IRON AND STEEL: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MECHANICAL AND MANUFACTURING INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.857	.914	1.102	1.192	1.383	1.907	1.402
All gainful workers, male and female.....	2.644	2.637	3.036	3.115	3.334	4.844	3.525
All in Manufacturing and Mechanical In- dustries	9.545	8.708	9.775	10.003	12.103	16.182	12.638
[Males of]							
All male gainful workers	3.064	3.096	3.642	3.785	4.151	5.925	4.362
All males in Manufac- and Mechanical In- dustries	10.584	9.979	11.436	11.797	14.364	18.607	14.155
[Females of]							
All female gainful workers .....	.220	.080	.130	.130	.230	.670	.560
All females in Manu- facturing and Me- chanical Industries..	.970	.320	.441	.464	1.291	2.948	

that accounts for the decrease in the total of the Iron and Steel group noted in 1930. In comparison with the development of the total of gainfully employed, the Iron and Steel group moved from 2.6 per cent in 1870 and 1880 to a peak of 4.8 per cent in 1920, and fell to 3.5 per cent in 1930, a percentage which, with the exception of the unusual war-time period recorded in 1920, is about the ratio maintained since 1890.

In Table 99 comparisons in rate of growth are made between the Iron and Steel group, the total population, and the total of gainful workers.

TABLE 99

PERCENTAGE CHANGE IN TOTAL POPULATION, TOTAL GAINFULLY EMPLOYED, AND WORKERS IN THE IRON AND STEEL GROUP, 1870-1930

Census	Total Popu- lation	Total Gainfully Employed	Iron and Steel Group
1870 .....	.....	.....	.....
1880	+ 30.1	+ 39.1	+ 38.7
1890	+ 24.8	+ 30.7	+ 50.5
1900	+ 21.4	+ 27.9	+ 31.2
1910	+ 21.0	+ 31.3	+ 40.5
1920	+ 14.9	+ 9.0	+ 58.4
1930	+ 16.1	+ 17.3	- 14.6
1930 over 1870...	+218.4	+290.5	+420.7

Because of the universal dependence upon iron and its alloys, the present period in our economic life has been aptly described as the "Iron Age." In the successive decades from 1890 to 1920 the group of workers engaged as operatives and craftsmen in iron and steel grew more rapidly than the rate of growth of either the total population or the total of gainful workers in all industry. Whereas the nation's labor force increased 290 per cent from 1870 to 1930, the Iron and Steel group increased 420 per cent.

The per-capita output of pig iron, including ferro alloys, was 327 pounds in 1890, 406 pounds in 1900, 777 pounds in 1920, and 786 pounds by 1929. This production growth was attained during a period of rapidly developing industrial economy. The recent depression caused a curtailment of the production of pig iron and steel. By 1931 the output amounted to only 332 pounds per capita, attesting the fact that the iron and steel industry is an integral part of the whole economy and subject to the factors at work in that economy.⁴⁸ In the Introduction to this chapter, in Table 54, additional data on production and employment, 1929-1936, are shown under the captions Iron and Steel; Blast Furnaces; Steel Workers and Rolling Mills, and Foundries; Primary smelters and refineries; and Secondary smelters and refineries.

Sex Composition of the Iron and Steel Group

Because of the character of the work performed in iron and steel factories and mills, the work is done largely by men. But, as technology has changed production methods so that machine tending is possible, more women have entered the field to compete successfully with men for many positions of this type. The sex composition of the Iron and Steel group is given in the following table:

Census	Percentage	
	Male	Female
1870	98.9	1.1
1880	99.5	0.5
1890	99.3	0.7
1900	99.3	0.7
1910	98.2	1.8
1920	97.2	2.8
1930	96.5	3.5

⁴⁸ United States Department of Labor, Bureau of Labor Statistics, *Bulletin No. 567*, 1932, p. 18.

Women began to take their places in iron and steel plants even before the World War, and a noticeable increase was recorded in the first decade of the present century. They made further advance as a result of the industrial expansion and the removal of many male workers during the war. But the advent of the automobile and mass fabrication of automobile parts offered women their real opportunity in iron and steel occupations. It is in this sphere of activity that most women workers in these heavy industries are found. The nature of iron and steel work is such that in all probability women's activities will be limited to these occupations for some time to come.

It is interesting to observe that the decline in the Iron and Steel group noted in 1930 as compared with 1920 was experienced by male workers only; women have increased steadily in every census from 1880 to 1930.

Machinists, Millwrights, Toolmakers, and Apprentices
(Tables 100 and 101)

All machinists, regardless of the particular industry with which they may be connected, are grouped by the census under "Iron and Steel" within the Manufacturing and Mechanical category. An industrial classification was given for 1910 and 1930 only. The industrial location of machinists may be seen in Table 100.

TABLE 100
DISTRIBUTION OF MACHINISTS BY INDUSTRIES FOR 1910 AND 1930

Industry	1910		1930	
	Number	Percent- age of Total	Number	Percent- age of Total
Iron and steel manufacturing.....	224,300	46.0	339,157	51.5
Steam and street railways.....	50,561	10.4	41,895	5.4
Lumber and furniture manufacturing...	15,664	3.2	19,815	2.6
Textile manufacturing	11,003	2.3	19,211	2.5
Other metals manufacturing	7,385	1.5	15,196	2.0
Paper and printing manufacturing.....	4,645	1.0	14,372	1.9
Chemicals and allied manufacturing....	2,048	.4	14,305	1.8
Food manufacturing	2,142	.4	9,641	1.2
Mining	5,807	1.2	7,603	1.0
Clay, glass, and stone manufacturing...	3,070	.6	6,946	.9
Building construction	8,513	1.7	4,266	.6
Clothing industry	1,261	.3	1,792	.2
All other	151,650	31.1	220,502	28.5
Total	488,049	100.1	774,701	100.1

TABLE 101

MACHINISTS, MILLWRIGHTS, AND TOOLMAKERS: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930*

Base	1870	1880	1890	1900	1910	1920	
All gainful workers, male and female...	.492	.671	.901	1.071	1.279	2.245	1.586
All in Manufacturing and Mechanical Industries	1.776	2.216	2.900	3.437	4.641	7.498	5.688
[Males of]							
All male gainful workers .....	.576	.788	1.085	1.305	1.622	2.825	2.034
All males in Manufacturing and Mechanical Industries	1.988	2.540	3.413	4.067	5.611	8.873	6.602

* This group includes apprentices and helpers. In the years prior to 1910 the census designations of this group varied.

* The numbers and percentages of women in this group are so small as to have only minor significance; see Table 97.

In 1910, of all machinists recorded by the census 46 per cent were related to the iron and steel industry directly, 54 per cent being distributed among all other industries. By 1930, 51.5 per cent had become part of the Iron and Steel group, and 48.5 per cent were in other activities.

While it is true that the mechanization of industry usually replaces handcraftsmen with semiskilled or unskilled machine operatives, it has been pointed out frequently that the increased use of machinery also makes jobs for machine-construction workers. In the first stages of such mechanization when machines are somewhat crude, their operation requires the watchful care of skilled machinists. Likewise, to make those improvements which increase machine efficiency, competent machinists are employed to observe the machines in operation under practical working conditions. But, as machines increase in importance, they must be further improved in efficiency so as to require little attention and a minimum number of stoppages for repairs or overhauling. This increasing efficiency of the machine itself tends, in the long run, to eliminate much of the work of that large corps of machinists which was required when machines were first installed to displace handworkers.

Machinists have increased in number in all industries re-

ported except steam and street railways, building construction, and miscellaneous industries. The latter group includes some industries, such as beverages, which were not reported in 1930. This trend toward greater industrial use of machinists is a positive evidence of the increasing introduction of machines along the whole industrial front.

The number of machinists listed in the Iron and Steel group increased from 61,519 in 1870 to a maximum of 934,125 in 1920 and declined to 774,701 in 1930. Machinists showed a numerical increase of 249,748 in the thirty years from 1870 to 1900; but expanded even more rapidly from 1900 to 1930, adding 463,434 workers to the group. This group constituted .6 per cent of the total population in 1930, 1.6 per cent of all gainful workers, and 45 per cent of all iron and steel workers. In comparison with the total labor force of the nation, except for the decade of 1920, machinists have assumed a steadily increasing importance.

In view of the trend toward greater mechanization of industrial life, barring some economic catastrophe of national magnitude, and assuming that the market demand will continue to develop as it has during the thirty years from 1900 to 1930, there is every prospect for an increasing force of machinists. While machinists located in a wide diversity of manufacturing plants will probably continue to increase in number for some time, there is every prospect of a larger proportionate increase in the number of machinists connected directly with the iron and steel industry.⁴⁰

Welding.—A rapid extension of the use of welding processes in recent years deserves attention in connection with trends in the use of metal. A brief discussion of the topic is placed here as a matter of convenience, although welding is in common use by workers in numerous census occupational categories and in many industries. The following information is derived from a useful article by Philip H. Smith in *Scientific American* for May 1936.

Welding has had and is having a revolutionary effect in production technique. From a tool of repair it has in recent

⁴⁰ A valuable study of 683 skilled metal workers in Philadelphia indicates that employment had increased from 1933 to May 1936. At the latter date seven-eighths of the group were employed. See *Ten Years of Work Experience of Philadelphia Machinists*, WPA National Research Project, Report No. P-5, September 1938; also "Machinists' Occupations," Revised, *Occupations, A Series of Vocational Studies*, NYA of Illinois, Research Report No. 2, May 19, 1938.

years become a primary tool of production. As a method of joining metals, welding permits faster, cheaper, and better work than can be had from the use of bolts, rivets, and metal reinforcements.

It is by means of welding that the low-priced automobile is made into a solid structure without squeaks and rattles. The railroad train and its tracks are likewise rid of the noises for which bolted joints were responsible. Air and marine ships are being welded into solid units, as well as steel houses and steel-frame constructions.

A major indirect outcome from the newer welding processes is a marked reduction of weight—of first importance to all transportation vehicles. The elimination of rivet holes makes for greater strength and for lighter sectional parts. Important economies have been possible during the depression from the use of welding in place of older, more costly methods of joining. Types of welding are adapted to manufacturing needs and are given a suitable precision. Maintenance and repair have also been made more effective and more economical. Welding has even been used for the repair and construction of bridges.

Among numerous other uses of welding is the joining of sections of pipe into miles of unbroken overland lines, as well as the joining of domestic and industrial piping of all types. Home and office furniture is being made by welding steel.

Practically all commercial metals are capable of being welded. The field of welding is only being opened up. There has been a sharp demand for trained welders that bids fair to continue.

Molders, Founders, and Casters

Metal molders are used in a wide variety of industries. The group totaled 105,158 in 1930. It was then .08 per cent of the total population, .2 per cent of the total gainfully employed, and 6.1 per cent of all iron and steel workers. This group increased from 1,543 in 1870 to a peak of 123,681 in 1920 and declined by 18,523 persons in 1930.

All during the years of simple clay or wood casting, which characterized the handcraft stage of metal molding, production was relatively costly, and, because of the unyielding character of the metals used,⁵⁰ the development of molded metals

⁵⁰ Jonathan N. Leonard, *Tools of Tomorrow*, Viking Press, 1935, pp. 143-44.

proceeded slowly. This is reflected in the trend of this group of workers from 1870 to 1900, at which latter date there were only 12,473 molders listed by the census. But, with the pressing demand of industry for more pliable metals, alloys were developed which permitted machine molding, and die-casting machines were invented to make practical the molding of metals into even intricate designs and delicate products. Most die-casting machines are now semiautomatic, and are operated by persons using much less skill than was required of molders in the handcraft stage of industry.

The newest methods of die-casting have been perfected only since the World War, but have already increased the output of cast metals enormously and have resulted in a reduction in the number of persons listed by the census as molders. This trend will probably continue, for the modern die-casting machine can do the work of hand molders more rapidly and with comparable or greater efficiency. In view of these facts it is probable that the services of skilled hand molders will be needed in the future primarily for experimental and testing purposes.

But, while this is the trend of modern technology, the casting of metals has not advanced in all lines of industry to the point where hand molders have been entirely displaced by die-casting; nor will this occur until the metal industry has become concentrated in relatively large plants which make use in a practical way of the possibilities of present-day technology.

Blacksmiths, Forgemen, Hammermen, and Apprentices

The craftsmen listed here and their apprentices are distributed through many industries, the majority of them being found in manufacturing and mechanical pursuits. During the time when much of iron and steel work was done by skilled smiths, the number of such skilled artisans increased rapidly. From 1870 to 1910 they increased 100,905. But with the invention and practical introduction of a multitude of labor-saving devices and machines and the introduction of gas and electric welding, skilled hand workers of iron and steel were rapidly displaced, until in 1930 the number recorded by the census was less than at any time since 1880.

Blacksmiths, Forgemen, Hammermen, and Apprentices was only .3 per cent of the total gainfully employed in 1930, the fewest it has been in any census record. The changes which have been wrought in the iron and steel occupations are sug-

gested by the fact that these hand workers were 43 per cent of all workers in iron and steel in 1870, and in 1930 comprised only 8 per cent of that body. Judging by the trend which has prevailed since 1910, and the conditions of growing mechanization in the iron and steel industry, it is probable that blacksmiths, forgemen, and hammermen will be further reduced in numbers as time goes on.

Boilermakers, Apprentices, and Helpers

Boilermakers and their apprentices and helpers are likewise found distributed through many manufacturing industries. This group of workmen increased from 6,958 in 1870 to a peak number of 76,093 in 1920, then declined to 50,554 in 1930. In comparison with the growth of the total gainfully employed the number of boilermakers increased more rapidly until 1920 but declined in 1930, being then .1 per cent of the national labor force, or proportionately less than at any time since 1890. This decline occurred during the period of greatest industrial expansion, when the number and size of power plants increased enormously and when a great many power and heating units were installed. It is partly due to the greatly increased use of internal-combustion engines and the electrification of railroads.

Furnacemen, Smeltermen, Heaters, Puddlers, etc.

The census has presented separate data covering the group here named for 1910 and 1930 only. In 1930 these workers numbered 35,166, which was less than in either of the two previous censuses. In comparison with the growth of the total gainfully employed, the group's relative significance likewise declined, reaching a point at which it was only .07 per cent of the national labor force in 1930.

These trends were developed during the period of unusual expansion of the steel and iron industry, which was based upon a very rapidly increasing market demand for their products. It would appear, therefore, that changes in technology, and in emphasis on certain products of iron and steel, were making smaller demands for furnace and smeltermen than for other iron and steel workers. Should such conditions continue, there is reason to suppose that the number of furnace and smeltermen will decline rather than increase in the immediate future.

Rollers and Roll Hands (Metals)

Rolling mills have increased their output greatly in the years since iron and steel products began to play an important part in our economic life. But despite the introduction of many labor-saving devices, the number of skilled rollers and roller-mill craftsmen increased from 2,796 in 1870 to a peak of 30,765 in 1930. Such workers were .06 per cent of the gainfully employed in 1930, and 1.8 per cent of all iron and steel workers. In comparison with the growth of the national labor force, they have increased in successive decades. However, their number is so small, that their influence upon the composition of the total gainfully employed is slight.

While there is some prospect that this group will continue to increase slightly in the decades immediately ahead, the rate of increase may be slackened by the introduction of still further labor-saving machinery. In fact there is some prospect that these skilled workers will be replaced entirely by semi-skilled operatives tending the new hot-strip semiautomatic mills. (See Tables 103 and 104.)

Wagon and Carriage Factory Operatives

In the trend of the number of wagon and carriage makers may be seen the demise of a symbolic feature of our national life, namely, the horse-drawn vehicle. In 1870 wagon and carriage factories employed 20,942 operatives, who made up 6.3 per cent of all iron and steel workers; in 1910 a maximum number of 22,339 operatives was reached. Then, with abrupt suddenness the number of workers in this industry dropped. Only 9,430 operatives were listed in 1920, and by 1930 the number had decreased to 2,766, or .16 per cent of all iron and steel workers. The few carriage makers still at work in their occupations make specialty equipment such as racing gigs or apparatus for road making and farm hauling. Except for a few workers on such specialties as these, this occupational group seems doomed to extinction.

Automobile Factory Operatives (Charts 15 and 19)

The census listed separately 161,957 operatives engaged in automobile factories in 1930, of whom 11 per cent were females. This is less than half the total average number of all kinds of workers employed in automobile factories, for the *Census of*

Manufactures listed 447,448 automobile workers in 1929. The "operative" group in the Manufacturing and Mechanical category is made up primarily of factory operatives belonging to the semiskilled class of laborers, and apprentices.⁵¹

The automobile industry is a product of the present century and has expanded rapidly since 1910. How it developed from 1910 to 1929 may be seen in Table 102, and in Table 54 under the caption "Motor Vehicles," on page 138.

TABLE 102

NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, OUTPUT OF PASSENGER AND BUSINESS CARS, WAGES PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE AUTOMOBILE INDUSTRY, 1909-1929*

		1919	1929	Change, 1929 over
Number of establishments.....	743	2,830	1,398	655
Percentage change		+ 280.9	- 50.6	+ 88.2
Average number wage earners....	75,721	343,115	447,448	372,177
Percentage change		+ 353.1	+ 30.4	+ 494.4
Number passenger cars.....	121,686	1,557,480	4,587,400	4,465,532
Percentage change		+1,178.0	+194.5	+ 3,664.2
Number business cars.....	4,725	126,436	771,020	766,295
Percentage change		+2,575.9	+509.8	+16,217.9
Wages per worker.....	646	1,431	1,638	991
Percentage change		+ 121.2	+ 14.5	+ 153.2
Value added by manufacture per worker	1,562	3,320	4,476	2,914
Percentage change		+ 112.5	+ 34.8	+ 186.3

* Figures for 1929, from *Biennial Census of Manufactures, 1931*, United States Department of Commerce, *Census of Manufactures, 1929*, XI, 1220, 1222; *Census of Manufactures, 1919*, X, 867-73. Figures per worker computed. The net percentage decline in the output of passenger cars from 1929 to 1934 is placed at 52; of trucks at 23.7 (C. A. Bliss, *op. cit.*). By 1936 a distinct advance had been made. The number of new cars produced in 1937 was 4,800,000, a figure that falls short of the 1929 production by 600,000. From 1935 to 1937 the number of wage earners in the motor vehicle industry increased from 147,000 to 195,000, in the "body and parts" industry from 241,000 to 285,000 (*Census of Manufactures, 1937*; see also Table 54, above).

In the beginning of a new industry, such as the making of automobiles, the usual experience is a rapid increase in the number of concerns engaged in its manufacture. Then, as it becomes more stabilized, the process develops an increasing size of plant and a decreasing number of establishments. Thus, the number of concerns manufacturing automobiles or auto parts reached its peak in 1920, and declined approximately 50

⁵¹ *Thirteenth Census of the United States, 1910*, "Population," IV, 91-92.

per cent in the following decade. The average number of wage earners per plant in 1909 was 101; by 1917 it had increased to 121, and by 1929 to 321.

Automobile production has been heavily affected by mechanization, breakdown, and simplification of tasks. One official declares that less than 5 per cent of his workers are skilled; others state that from 60 to 75 per cent of their workers reach their maximum efficiency within a few days after starting. Auto workers have been classified into three groups: tenders who operate and watch the machines and perform specialized tasks as the material flows by them on the belt; the technical force who design, plan, blueprint, route, and cost the work; the clerks, inspectors, and foremen, who record what is done and check and watch over others.

It is estimated that 25 to 40 per cent of the operatives in a typical plant are machine tenders, 10 to 15 per cent assemblers, 15 per cent laborers, 5 to 10 "skilled" workers, and 5 per cent inspectors and testers. Tenders and assemblers have been increasing relatively in recent years. To provide for their special needs many plants maintain schools. Seasonality is one of the most serious ailments of the industry.⁵²

A very large potential market for cars still exists if purchasing power could be increased. Mechanization and rationalization will undoubtedly continue to reduce costs and prices somewhat. This industry makes use of all grades of labor, young and old, men and women, Negro and white, and will undoubtedly remain a permanently important field of labor.

The workers employed in automobile manufacture did not share proportionately with the other claimants in the increased value added by manufacture to the raw materials of which automobiles were made. In the twenty years from 1909 to 1929 the increase in wages paid per worker was 153 per cent; but the increase in value added by manufacture per worker rose 186 per cent.⁵³

⁵² From a useful monograph, "The Automobile Industry," Revised, *Occupations, A Series of Vocational Studies*, 1939, NYA of Illinois (W. J. Campbell, State Director, Chicago). National figures from 1925 to 1935 are summarized in "The Professional Salesman," NYA for Kentucky (O. C. Amis, State Supervisor, Louisville, Kentucky).

⁵³ *Handbook of Labor Statistics*, 1936 edition, Bulletin No. 616, United States Department of Labor, Bureau of Labor Statistics, pp. 79-107 ff. The cost-of-living figures show an increase of 73.7 per cent in 1929 over 1913. If this is taken as a basis of comparison, the real income of the average automobile worker has advanced over 80 per cent in the last twenty years. This does not take into account the change in buying

The motor vehicle industry has undergone great concentration since the early days of pioneering in the first decade of this century. From several hundred concerns engaged in automobile manufacture, only eleven emerged in 1939. Of these eleven, three companies, General Motors, Chrysler, and Ford, accounted for 90 per cent of new passenger cars registered in 1938.⁵⁴ Technological change has made rapid strides in automobile manufacture. The output per man-hour in 1929 was 57.3 per cent greater than in 1919, and technological progress continued to be made during the restricted output of the depression, for by 1936 the productivity per man-hour had increased 15.7 per cent above that of 1929.⁵⁵

Agricultural Implement Factory Operatives (Chart 16)

Data on agricultural implement factory operatives were segregated by the census for the first time in 1910. The number engaged in making agricultural implements increased from 4,866 in 1910 to a peak of 8,782 in 1930. In that year this group was .018 per cent of the total gainfully employed. It was an expanding group in actual numbers only; relative to the working population it was practically stationary. It is much too small numerically to produce any appreciable difference in the make-up of the total labor force of the nation. Additional data on production and employment in this industry from 1929 to 1936 are displayed in Table 54 on page 138.

power reflected in the fact that nowadays from a third to a half of the cost of an article goes into its marketing costs and not into its real value. Thus, as Charles S. Wyand points out: "It is not unreasonable to contend that the wage earner at the turn of the century actually had a lower cost of living than the contemporary worker despite the influence of modern labor-saving devices and higher real wages."—*The Economics of Consumption*, The Macmillan Company, New York, 1937, p. 466.

⁵⁴ A very good account of the automobile industry appears in the report of the Federal Trade Commission, *Motor Vehicle Industries*, Washington, D.C., 1939.

⁵⁵ *Production, Employment, and Productivity*, WPA National Research Project, Washington, D.C., 1939, Part Two, p. 144.

In a research study published recently by the Automobile Manufacturers' Association, 366 Madison Avenue, New York City, *Men, Methods, and Machines*, a very readable and at first glance a plausible account is given of technological change in automobile manufacture which concludes that it has not resulted in labor displacement or unemployment. One table, on page 4 of the pamphlet, shows that factory employment per 100 cars produced increased from 10.0 years in 1923 to 10.8 years in 1937. This is evidence offered to show that technological displacement has not occurred, that it takes more working time to produce the modern car despite increased technical skills than it did the cars made in 1923. Unfortunately, the table is fallacious in that it is comparing car production with factory employment, whereas the workers listed are making not only automobiles but also replacement parts and accessories. The latter have come in recent years to be a major part of automobile factory output and employment. If segregation were possible, it would definitely show that employment per unit of car product has been considerably reduced in the past ten years. This is indicated by the fact that parts production was a relatively small element in production in 1923, but that in 1933 approximately 38 per cent of the value of motor vehicle factory production was parts and accessories.

Ship- and Boatbuilding Operatives

The census permits separate analysis of the trends in the number of shipbuilding operatives from 1910 to 1930. In 1910 there were 14,530 workers listed in this group. In 1920, with some influence still remaining from the feverish World War expansion in boatbuilding, there were 97,666 persons listed as operatives in this industry. By 1930 the number had declined to 19,969.

The building of ships is greatly affected by public policy as well as by conditions prevailing in private industry. If the policy of an expanding merchant marine should become established in the United States, a marked revival in shipbuilding may be expected to follow, and an increased number of shipbuilding operatives may be found in the next census.⁵⁶ It is this uncertainty concerning public policy which makes it impossible to predict the future of the shipbuilding industry. Under private auspices, and given the competitive situation in which foreign shipyards vie with American yards, there is less prospect for an expansion in shipbuilding. During periods of peace, much of American ship construction is confined to pleasure craft and small commercial boats of one sort or another.

Blast Furnace and Steel Rolling Mill Operatives

This group of machine tenders is segregated by the census for the years since 1910. In 1930, the total number of such operatives was 106,664, the peak labor force in this branch of the steel and iron industry since 1910. The technological improvements in blast furnaces and rolling mills which have been made since the turn of the century are numerous and revolutionary. All are intended to produce a greater amount of pig iron and rolled steel with as much saving in the labor bill as possible. How this has affected the entire labor force is indicated in Table 103. See also Blast Furnaces, and Steel Works and Rolling Mills, Table 54.

Steel production increased 116 per cent from 1910 to 1930, and pig-iron production increased 56 per cent, while the total labor force available increased 55 per cent; the number of rollers and roller mill hands increased 67 per cent and blast furnace and steel mill operatives increased 52 per cent. Much of this increased labor force was made necessary by the gen-

⁵⁶ See page 404, below, the chapter on "Transportation and Communication."

TABLE 103

**PRODUCTION OF PIG IRON AND STEEL COMPARED WITH NUMBER OF ROLLERS
AND ROLLER HANDS AND BLAST FURNACE AND STEEL MILL
OPERATIVES AVAILABLE, 1910-1930***

	1910		1930	Increase, 1930 over 1910
Steel (1,000 long tons)	26,095	42,133	56,433	30,338
Percentage increase .....	....	61.4	33.9	116.3
Pig iron (1,000 long tons)	27,304	36,926	42,614	15,310
Percentage increase .....	....	35.2	15.4	56.1
Rollers and roller hands	18,407	25,061	30,765	12,358
Percentage increase .....	....	36.1	22.7	67.1
Blast furnace and steel mill operatives	70,273	93,627	106,664	36,391
Percentage increase .....	....	33.2	13.9	51.8

* Figures on production are from Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, New York, 1934, pp. 294-96. Production under the column 1930 is for the year 1929. Figures for workers are taken from the *Fifteenth Census of the United States, 1930*, "Population," IV, 9. These figures are for available rather than employed workers in this industry and are, therefore, probably too high.

eral reduction from a twelve to an eight-hour day, which had the effect of "spreading the work."

The Department of Labor made a special study of conditions in iron and steel works from which the figures in Table 104 have been taken. The data are not directly comparable

TABLE 104

**NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PER
WORKER, AND VALUE OF PRODUCTS PER WORKER IN THE BLAST
FURNACE AND STEEL ROLLING MILL INDUSTRIES, 1919, 1929***

	1919	1929
<i>Blast furnace</i>		
Number of establishments	209	105
Percentage change .....	...	-49.8
Average number of wage earners.....	43,296	24,960
Percentage change .....	...	-42.4
Wages per worker	\$1,766	\$1,681
Percentage change .....	...	-4.8
Value of products per worker	\$19,041	\$30,906
Percentage change .....	...	+62.3
<i>Steel rolling mills</i>		
Number of establishments	500	486
Percentage change .....	...	-2.8
Average number of wage earners	375,088	394,574
Percentage change .....	...	+5.2
Wages per worker	\$1,700	\$1,746
Percentage change .....	...	+2.7
Value of products per worker	\$7,542	\$8,530
Percentage change .....	...	+13.1

* United States Department of Labor, Bureau of Labor Statistics, *Wages and Hours in the Steel Industry*, Bulletin No. 567, p. 19.

with the census figures, for they include the average number of workers of all classes actually employed in the particular branch of the industry reported, whereas the census makes an occupational rather than an industrial report.

The table shows that the wage payment per employed worker in blast furnaces actually declined from 1919 to 1929, while the value of products per worker increased greatly. Even in steel rolling mills the wages paid per worker did not advance in proportion to the increase in value of products per worker.

The merging of plants into fewer and larger units, which is characteristic of our industrial economy, has taken place in this industry in the ten-year period. In the blast furnaces, a reduction in value of output of 6.4 per cent occurred; but the number of workers was reduced 42 per cent, and the total wage bill declined 45 per cent. In the steel rolling mills the number of workers increased 5.2 per cent and the total wage bill advanced 8 per cent, but the total value of products increased 19 per cent. Some of the changes which took place from 1929 to 1936 are indicated in Table 54.

The trend in number of operatives employed in blast furnaces and steel rolling mills, taken together, was upward in the successive census decades of this century. The market demand for steel products likewise expanded. As the Brookings Institution study reveals, this market demand was somewhat below actual plant capacity.⁶⁷ The future of steel production is uncertain. The industry has become so well organized that it can make profit even on a partial-production basis. In unusual periods of demand, such as were experienced in the fall of 1939 with the building up of war-time inventories, certain obsolete plants which used exceptionally large proportions of man power were brought back into production. Even so, the available labor force of steel workers was not re-employed. Technological changes installed since 1937 or now in process of installation indicate further reductions in the labor force required per unit of output.

Other Iron and Steel Machinery Factory Operatives

There are many iron and steel factories making machinery and other metal products which are not listed separately in

⁶⁷ Edwin J. Nourse *et al.*, *America's Capacity to Produce*, Brookings Institution, Washington, D.C., 1934, pp. 251-70, 512-18.

the census. The number of operatives in such plants increased from 94,790 in 1870 to 290,538 in 1900, dropped somewhat in 1910, and increased from 1910 to 1930. In 1930 this group of workers numbered 276,800, and made up .56 per cent of all gainful workers and 16.1 per cent of the Iron and Steel group.

The trend toward concentration of industry is at work constantly to consolidate small units into larger systems of production.⁵⁸ Thus, many of these small plants make a particular product built around some patented invention or innovation in processing, and continue as separate institutions until they achieve a certain permanence and importance. Then they either absorb other similar or closely allied plants, or are themselves taken into some other existing corporate group.

Many among the two and three-quarters million iron and steel operatives listed in this subgroup are in such establishments performing one or another occupational function in the preparation of iron and steel products. The future of such workers, as indicated by the trends, seems uncertain. As industry becomes unified, it is probable that the census will record fewer separate manufactures within the Iron and Steel group. This may not mean that there will be fewer workers in these industries, but they will probably be part of one or another of the few large manufacturing concerns.

G. METALS GROUP

General Characteristics (Tables 105 to 109)

The Metals group comprises workers in brass and copper factories, goldsmiths and silversmiths, manufacturing jewelers, clock and watch workers both in factories and in individual enterprises, lead and zinc workers, tinsmiths and sheet metal workers, tinware and enamelware makers, gunsmiths and locksmiths, electroplaters, and filers, grinders, and polishers. Obviously, much of this classification is for convenience only, as the occupational affinity between many of these subgroups of workers is not close, nor are they affected in the same way or to the same degree by forces at work in our economy which increase and decrease the labor supply.

⁵⁸ See Harry Laidler, *Concentration in American Industry*, Thomas Y. Crowell Company, New York, 1931, pp. 36-40.

TABLE 105

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN THE METALS GROUP, 1870-1930

Group	1870	1880	1900	1910	1920	1930	
Brass Mills	{ 4,863 7.1	{ 11,568 10.2	{ 17,265 10.9	{ 26,760 13.1	{ 16,885 7.9	{ 17,482 6.4	{ 14,834 5.0
Copper Factories	{ 2,122 3.1	{ 2,342 2.1	{ 3,384 2.1	{ 8,185 4.0	{ 1,968 .9	{ 2,986 1.1	{ 2,950 1.0
Jewelers, etc.	{ 20,287 29.7	{ 42,225 37.4	{ 45,515 28.8	{ 50,232 24.6	{ 66,706 31.2	{ 81,791 30.2	{ 74,756 25.3
Lead and Zinc Facto- ries	{ 649 1.0	{ 2,105 1.9	{ 4,616 2.9	{ 5,334 2.6	{ 1,915 .9	{ 2,464 .9	{ 2,014 .7
Tinsmiths, etc.	{ 30,524 44.8	{ 42,818 37.9	{ 57,525 36.5	{ 70,505 34.5	{ 59,833 28.0	{ 77,784 28.7	{ 85,364 28.9
Tinware and Enamel- ware					10,611	19,356	23,290
Other Metal Facto- ries	9,751 14.3	11,947 10.6	29,512 18.7	43,083 21.1	5.0 2.9	7.1 3.5	7.9 4.7
Fillers, Grinders, Buf- fers, and Polishers					49,525 23.2	59,785 22.0	78,600 26.6
Total	{ 68,196 100.0	{ 113,005 100.1	{ 157,817 99.9	{ 204,09 99.9	{ 213,586 100.0	{ 271,085 99.9	{ 295,655 100.1

TABLE 106

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE METALS GROUP, 1870-1930

Group	1870		1890		1900		1910		1920	
Brass Mills	{ 4,757 7.2	10,831 10.1	16,352 11.2	25,870 13.8	14,350 7.7	13,576 5.8	11,606 4.4			
Copper Factories	{ 2,118 3.2	2,326 2.2	3,377 2.3	8,174 4.3	1,915 1.0	2,834 1.2	2,824 1.1			
Jewelers, etc.	{ 18,983 28.5	38,440 35.9	37,470 25.6	39,037 20.8	51,534 27.5	63,582 26.9	58,584 22.4			
Lead and Zinc Facto- ries	{ 556 .8	2,105 2.0	4,413 3.0	5,237 2.8	1,652 .9	2,186 .9	1,840 .7			
Tinsmiths, etc.	{ 30,507 45.9	41,781 39.0	56,623	68,730 36.6	59,809 31.9	77,772 32.9	85,358 32.7			
Tinware and Enamel- ware					6,674 3.6	12,167 5.2	15,250 5.8			
Other Metal Facto- ries	9,601 14.4	11,638 10.9	28,337 19.3	40,871 21.7	4,638 2.5	6,660 2.8	9,394 3.6			
Fillers, Grinders, Buf- fers, and Polishers					46,679 24.9	57,315 24.3	76,264 29.2			
Total	{ 66,522 100.0	107,121 100.1	146,572 100.0	187,919 100.0	187,251 100.0	236,092 100.0	261,120 99.9			

242 MANUFACTURING AND MECHANICAL INDUSTRIES

TABLE 107

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE METALS GROUP, 1870-1930

Group	1870	1880	1900	1910	1920	1930
Brass Mills	106 6.3	737 12.5	913 8.1	2,535 9.6	3,906 11.2	3,228 9.3
Copper Factories	4 .2	16 .3	7 .1	11 .1	53 .4	126 .4
Jewelers, etc.	1,304 77.9	3,785 64.3	8,045 71.5	11,195 69.2	15,172 57.6	16,172 52.0
Lead and Zinc Facto- ries	93 5.6	203 1.8	97 .6	263 1.0	278 .8	174 .5
Tinsmiths, etc.	17 1.0	1,037 17.6	902 8.0	1,775 11.0	24 .1	12*
Tinware and Enamel- ware				3,937 14.9	7,189 20.5	8,040 23.3
Other Metal Facto- ries	150 9.0	1,175 5.3	2,212 10.4	1,505 5.7	2,777 7.9	4,453 12.9
Fillers, Grinders, Buf- fers, and Polishers				2,846 10.8	2,470 7.1	2,336 6.8
Total	(1,674 100.0	5,884 100.0	11,245 99.9	16,180 100.1	26,335 99.9	34,993 99.9
						34,535 100.0

* Less than .001 per cent.

TABLE 108

WORKERS IN THE METALS GROUP: PERCENTAGE OF TOTAL POPULATION,
OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANU-
FACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1890	1900	1910	1920	1930
Total population .....	.177	.225	.252	.268	.232	.241
All gainful workers, male and female .....	.545	.650	.694	.702	.560	.605
All in Manufacturing and Mechanical In- dustries	2.000	2.100	2.200	2.300	2.000	2.200
[Males of]						
All male gainful workers .....	.623	.726	.779	.791	.622	.686
All males in Manufac- turing and Mechani- cal Industries	2.200	2.300	2.500	2.500	2.200	2.200
[Females of]						
All female gainful workers .....	.090	.230	.280	.300	.320	.320
All females in Manu- facturing and Me- chanical Industries ..	.400	.800	1.000	1.100	1.400	1.800

This group contained 295,655 metal workers in 1930, their number constituting .24 per cent of the total population, .6 per cent of the total gainfully employed, and 2.1 per cent of all workers in manufacturing and mechanical pursuits. In 1870 the number of metal workers was 68,196 and there was an increase in each successive decade thereafter to 1930. In percentage of the total labor force of the nation, the number of metal workers increased from 1870 to 1900, decreased in 1910, increased in 1920, and decreased again in 1930. In this collection of distinct groups of workers the proportion of each group separately listed by the census in 1930 was as follows:

Group	Percentage
Brass Mills	5.0
Copper Factories	1.0
Jewelers, etc.	25.3
Lead and Zinc Factories	0.7
Tinsmiths, etc.	28.9
Tinware and Enamelware	7.9
Other Metal Factories	4.7
Filers, Grinders, Buffers, and Polishers...	26.6
Total	100.1

How the entire group in Metals Industries has fared in comparison with the development of the total population and the national labor force can be seen in Table 109.

TABLE 109

PERCENTAGE INCREASE OF THE TOTAL POPULATION, THE TOTAL GAINFULLY EMPLOYED, AND THE TOTAL IN THE METALS GROUP, 1870-1930

Census	Total Population	Total Gainfully Employed	Total in Metals Group
1870 .....	....	....	....
1880	30.1	39.1	65.7
1890	24.8	30.7	39.7
1900	21.4	27.9	29.3
1910	21.0	31.3	4.6
1920	14.9	9.0	26.9
1930	16.1	17.3	9.1
1930 over 1870 .	218.4	290.5	333.5

The comparison of 1930 with 1870 conceals a considerable part of the development which took place in the Metals group in comparison with that of the total population and of all gainful workers. Metal workers increased in number in that period much more rapidly than the other two. But this group experienced a somewhat uneven development, beginning with an un-

usual increase from 1870 to 1880, sustaining an increase comparable with the development of the national labor force in 1900, a decided decrease in growth below either that which took place in the total population or in the total of gainful workers in 1910, a sudden rise above both these groups in 1920, and another decline below them in 1930. What accounts for these oscillations cannot be determined for the entire group until each numerically important subgroup has been examined separately.

Sex Composition of the Metals Group

The relative importance of the two sexes in the metal occupations is recorded in the following percentage display.

Census	Percentage	
	Male	Female
1870	97.5	2.5
1880	94.8	5.2
1890	92.9	7.1
1900	92.1	7.9
1910	87.7	12.3
1920	87.1	12.9
1930	88.3	11.7

Females made their first appreciable advance into the ranks of metal workers as recorded in 1880. From then until 1920 they increased rapidly in each successive decade, to become 13 per cent of all such workers in that year. Women are engaged primarily in jewelry manufacturing plants. There was a sufficient decline in the number of these women from 1920 to 1930 to account for the fact that female workers of the Metals group failed to advance in numbers in the last census. While the number of males working in jewelry factories also decreased in that decade, the increase in the number of tinsmiths, and that of grinders, buffers, and polishers of metals was sufficient to register an over-all increase of males in the Metals group from 1920 to 1930.

Brass Mill Workers

The number of operatives in brass mills totaled 14,834 in 1930, being .03 per cent of the total gainfully employed. Their peak number was 26,760 in 1900. During the first thirty years under review the numerical gain was 21,897; during the last thirty years a decline of 11,926 was recorded. Some of the increase in the number recorded for 1900 undoubtedly can

be attributed to census classification. A change in demand is largely responsible for the changed labor force in this group of brass workers. Mass production of automobile and radio parts, lighting fixtures, and other hardware took a dominant place in the industry after 1900, as indicated by the fact that there were fewer operatives listed in 1930 than in 1910; but common laborers were of sufficient number in 1930, namely, 14,809, to make the total working force greater by 1,873 workers than it was in 1910. These figures indicate that a degrading of labor used in brass production and an increasing productivity per worker with the aid of modern machinery had occurred during the period of greatest technological development since 1900. In comparison with the development of the total gainfully employed, brass-work operatives increased more rapidly until 1900, declined sharply in 1910, and continued to decline to 1930 but at a less rapid rate.

Operatives in Copper Factories

The group comprising operatives in copper factories is small, totaling only 2,950 in 1930. It increased from 2,122 in 1870 to a maximum of 8,185 in 1900, dropped to less than 2,000 in 1910, and rose to approximately 3,000 in 1920, at which point it remained in 1930. This does not mean that the domestic use of copper has fallen off similarly. The total labor force in copper manufacture in 1930 (operatives and laborers combined) was 2,591 less than in 1910. While operatives increased, common laborers decreased during the twenty years under review.

Much copper ore goes into manufacturing materials, wire, and articles other than those turned out by copper factories. How the nation has consumed copper may be seen in the following figures.⁵⁹

Year	Million Pounds of Copper Consumed	Percentage Increase
1890	193	....
1900	357	85.0
1910	732	105.0
1920	1,054	44.0
1929	1,779	68.8
1929 over 1890	1,586	821.8

⁵⁹ Arthur F. Burns, *Production Trends in the United States Since 1870*, National Bureau of Economic Research, 1934, pp. 301-02. The net percentage decline in the consumption of copper from 1929 to 1934 is placed at 65 (C. A. Bliss, *op. cit.*, p. 11). By 1936 the 1930 figure had been attained, with a substantial increase in 1937 (*Yearbook of American Bureau of Metal Statistics*, 1937, p. 11).

Jewelers, etc.

Manufacturing jewelers, including clock- and watchmakers, factory jewelers, and operatives, totaled 74,756 in 1930. They were .06 per cent of the total population, and .15 per cent of the total gainfully employed. A maximum of 81,791 was reached in 1920. In comparison with the growth in the total labor force of the nation these workers have followed an erratic course. They increased more rapidly in 1880, decreased in 1890 and 1900, gained slightly in 1910, gained again in 1920, and dropped considerably in 1930. They were proportionately more of the total working population in 1880 than at any other census. Being largely a luxury industry, jewelry manufacture changes with styles and fashions, and is dependent very materially upon the general course of economic affairs which either raises or lowers purchasing power.

The modern jewelry industry has been subjected to intensive reorganization characterized by the making of cast ornaments using machine-set glass and stone. While a great deal of the work done has been mechanized, much of it is still in the handcraft stage. Technology has not yet had its fullest effect and as the introduction and use of labor-saving machinery becomes more profitable more workers will be released to other industries, unless, of course, the greatly enlarged output of jewelry finds a ready market so that the present labor force will be required despite the greater per-worker productivity. This seems to have been the case as indicated by the trend from 1870 to 1920; but the decline from 1920 to 1930 suggests the operation of other forces, such as the more pronounced effects of technology and the use of machine-made costume jewelry as substitutes for genuine jewelry. In Tables 110, 111, and 112 certain data are offered which indicate the trends in production and the employment of workers in jewelry, etc. In these tables the entire employed wage-earning labor force is assembled, which does not correspond with the census figures for available workers.

In Table 110 the watch- and clockmaking industry is observed. The maximum development in both number of establishments and average number of workers employed took place in the decade from 1909 to 1919. However, in wages paid, value of products, and value added by manufacture, the successive decades have shown substantial increases. For the thirty-year period, 1899-1929, the increase in number of estab-

TABLE 110

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE CLOCK, WATCH, AND PARTS INDUSTRIES, 1899-1929*

	1899	1909	1919		Change, 1929 over
Number of establishments ..	109	120	124	121	12
Percentage change		+10.1	+ 3.3	- 2.4	+ 11.0
Average number of wage earners	17,155	23,857	28,622	24,854	7,699
Percentage change		+39.1	+ 20.0	-13.2	+ 44.9
Wages per worker	\$485	\$ 543	\$1,101	\$1,222	\$ 737
Percentage change		+12.0	+102.8	+11.0	+152.0
Value added by manufacture per worker	\$775	\$1,009	\$1,888	\$2,612	\$1,837
Percentage change		+30.3	+ 87.0	+38.4	+237.2

* *Census of Manufactures, 1929, II, 1032.* Per-worker figures computed. By 1937 the number of establishments had declined to 104 and the average number of wage earners had increased to 25,674 (*Census of Manufactures, 1937, "Wage Earners," p. 8*).

lishments was 11 per cent; the average number of workers employed increased 45 per cent; the average wages paid per worker advanced 152 per cent, indicating a considerable increase in money wages for persons employed in watch and clock factories. However, the value added by manufacture per worker advanced 237 per cent. The disparity between the advance in average wages paid per worker, and the value added by manufacture per worker, indicates that workers, while receiving more money wages over the thirty years, did not share proportionately with other claimants upon the value added by the manufacture of watches and clocks.

Table 111 displays the number of jewelry workers engaged in the lapidary industry cutting precious and semiprecious stones and in the manufacture of real and imitation stones for emblems and ornaments. The number of such establishments increased 66 per cent from 1899 to 1929; the average number of wage earners employed advanced only 1.6 per cent. Wages paid per worker increased 97 per cent, and the value added by manufacture per worker rose 222 per cent. Again, it is apparent that workers, whose money wages were improved considerably, did not share proportionately with other claimants upon the value added by manufacture.

TABLE 111

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE LAPIDARY INDUSTRY, 1899-1929*

		1909	1919		Change, 1929 over
Number of establishments ..	60	77	124	100	40
Percentage change .....	....	+28.3	+ 61.0	-19.4	+ 66.7
Average wage earners	498	627	1,155	506	8
Percentage change .....	....	+25.9	+ 84.2	-56.2	+ 1.6
Wages per worker	\$1,002	\$1,417	\$2,457	\$1,980	978
Percentage change		+41.4	+ 73.3	-19.4	+ 97.6
Value added by manufacture per worker	\$2,272	\$4,170	\$9,195	\$7,330	\$5,058
Percentage change		+83.5	+120.4	-20.3	+222.3

* *Census of Manufactures, 1929, II, 1313.* By 1937 the number of establishments had decreased to 51 and the average number of wage earners to 217 (*Census of Manufactures, 1937, "Wage Earners," p. 18*).

Table 112 pertains more particularly to the manufacture of jewelry. The number of establishments increased in the thirty years by 80 per cent; the average number of wage earners advanced 36 per cent; wages per worker increased 168 per cent; and the value added by manufacture per worker

TABLE 112

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE JEWELRY INDUSTRY, 1899-1929*

		1919	1929		Change, 1929 over
Number of establishments ..	851	1,537	2,054	1,536	685
Percentage change		+80.6	+ 33.6	-25.2	+ 80.5
Average wage earners em- ployed	20,468	30,347	30,871	27,922	7,454
Percentage change .....	....	+48.3	+ 1.7	- 9.6	+ 36.4
Wages per worker	\$ 520	\$ 605	\$1,162	\$1,392	\$ 872
Percentage change		+16.3	+ 92.0	+19.8	+167.9
Value added by manufacture per worker	\$1,167	\$1,438	\$3,029	\$3,492	\$2,325
Percentage change		+23.2	+110.7	+15.3	+199.3

* *Census of Manufactures, 1929, II, 1060.* Figures per worker computed. By 1937 the number of establishments had declined to 974 and the average number of wage earners to 20,368 (*Census of Manufactures, 1937, "Wage Earners," p. 18*).

advanced 199 per cent. Once again, workers failed to secure a proportionate share of the value added by the manufacture of jewelry.

In all three tables it appears that the jewelry industries reached a peak level in number of establishments and workers in 1919, and suffered a decline by 1929. Whether this decline is temporary or permanent cannot be determined as yet, but with respect to the number of workers actually employed all three branches of "jewelry" manufacture are in agreement, employing fewer workers on the average in 1929 than in 1919.

Lead and Zinc Factory Operatives

Another small division within this Metals group includes the semiskilled operatives in lead and zinc factories. The number of such workers increased from 1870, when there were only 649 listed in the census, to a maximum of 5,334 in 1900, dropped to 1,915 in 1910, and numbered 2,464 in 1920.

With respect to the development of the total of gainful workers in the nation the Lead and Zinc group increased rapidly from 1870 to 1890 but in 1900 showed a slight decline from the previous decade. From 1910 to 1920, during a period of greatly expanded production, this group maintained about the same level; but by 1930 it had declined to a point where it was smaller in the proportion of all workers than at any census in the past sixty years. Thus not only is a numerical decrease noted but also a decline in relation to the national labor force.

Tinsmiths, etc.

This group of tinsmiths, sheet metal workers, coppersmiths, tinplate workers, tinnern, tinware workers, and their apprentices totaled 85,364 in 1930, its largest number ever recorded by the census. In 1930, 80,400 of these workers were listed as Tinsmiths and Sheet Metal Workers. This latter group comprised .17 per cent of the total of gainful workers, .62 per cent of the workers in this metals division. "Tinsmiths" constitutes a group of workers which overlaps several industries, being of importance both to the building trades and to the manufacturing industry. The census chooses to list them with the Metals group under the Manufacturing and Mechanical Industries. Because they possess this multiple character, they are influenced by events occurring both in manufacturing and in construction.

From 1870 to 1900 the Tinsmiths group increased 39,981 in number; from 1900 to 1930 the rate of increase had slackened so that only 14,859 were added to the labor force. Here is evidenced once more that striking phenomenon of our industrial group, namely, that even when groups of workers continue to increase in numbers the actual numerical increase in the decades since the turn of the century is considerably smaller than the increase made in the years of land settlement and the initial period of industrial expansion when modern industry and the factory system were being developed. Yet population has continued to grow, and the demands of that population for construction and articles of manufacture in which the services of tinsmiths are required have increased enormously. Technology has come to the aid of industry to make this output possible without a proportionate increase in the most costly element in such manufacture, namely, the number of workers employed. Thus, as modern industry reaches maturity, increased productivity is secured largely at the expense of labor.

Tinsmiths maintained their relative position in the national labor force from 1870 to 1900, dropped considerably in 1910, gained slightly in 1920, and again declined in 1930. In the 1930 census the proportion of tinsmiths in the total of gainfully employed was less than in any census on record since 1870 except 1910. Thus, while numerically increasing, they are becoming a relatively less significant part of all occupations in which American workers engage.

Tinware and Enamelware Workers

The census permits segregation of operatives in tinware and enamelware factories since 1910. In 1930 their number was 23,290 and they made up .04 per cent of the gainfully employed. They have increased in each decade from 1910 to 1930, their 1930 number being more than twice as great as that of 1910. They have likewise increased more rapidly than the increase made in the total of gainful workers, in which body they are assuming somewhat more importance. But their number is too small to have significant effect upon it.

Much of the production of tinware and enamelware factories is already mechanized; considerably more will become so in time. Such workers are primarily semiskilled machine operatives and unskilled laborers. While the productivity of

workers in these manufactures increased greatly, the demand for their products likewise increased at such a rate that no over-all reduction in tinware and enamelware operatives resulted prior to 1930. Yet, even in the twenty years after 1910, despite the greater production of such ware, a decrease in rate of increase in number of workers is visible, from 8,745 tinware and enamelware operatives added from 1910 to 1920, to 3,934 such workers added during the most prosperous decade of our national life, in the period from 1920 to 1930.

In Table 113 data are assembled concerning tinware establishments.

TABLE 113

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE TINWARE INDUSTRY, 1909-1929*

	1909	1919	1929	Change, 1929 over
Number of establishments	318	301	232	
Percentage change		- 5.3	-22.9	- 27.0
Number of wage earners	19,754	34,386	31,497	11,743
Percentage change		+ 74.1	- 8.4	+ 59.4
Wage per worker	\$439	\$1,003	\$1,213	\$ 774
Percentage change		+128.7	+20.9	+176.3
Value added by manufacture per worker	\$990	\$2,001	\$3,236	\$2,246
Percentage change		+102.0	+61.6	+226.9

* *Biennial Census of Manufactures, 1931*, p. 858. Per-worker figures computed. In the tinware industry as reported by the *Biennial Census of Manufactures, 1935* (p. 956) and in the preliminary report for 1937 (p. 30) a decline in the number of establishments is shown from 232 to 204 from 1929 to 1935 and an increase of 20 by 1937. The average number of wage earners is placed at 27,484 in 1935 and at 33,145 in 1937.

It is to be remembered that this table is an industrial display, giving figures on the total of wage earners employed in tinware establishments, which includes both operatives and the laborers employed in these factories. The number of establishments has declined steadily since 1909, showing a loss of 27 per cent in the twenty-year period. The average number of employed workers per plant in 1909 was 62, whereas by 1929 it had increased to 136.

During this twenty-year period the labor force employed increased 60 per cent. But this inclusive figure conceals the trend, for the gain was made in the ten-year period from 1909 to 1919, and an actual loss was sustained in the succeed-

ing decades. A labor force in 1929 which was 8 per cent smaller than in 1919 produced an increased amount of tinware, of which the value added by manufacture gained 48 per cent in that time. This is striking evidence of the effect of labor-saving machinery.

While wages per worker increased 176 per cent from 1909 to 1929, the value added by manufacture per worker increased 227 per cent, showing that wage earners did not share proportionately with other claimants upon the increased value of manufactured tinware.

Other Metal Factories Workers

Operatives in Other Metal Factories constituted a labor force totaling 13,847 in 1930, the largest since 1900, when a maximum number of 43,083 was recorded by the census. Before 1900 the census included other groups in this classification which were recorded elsewhere after 1900.⁶⁰

The rapid expansion in the use of aluminum requires special mention at this point. The industry embraces establishments engaged primarily in the manufacture of aluminum plates and sheets, motor-vehicle and other commercial castings, kitchen and other household ware (except electrical appliances), and other aluminum articles. The aluminum products industry does not include the primary production of the metal or the recovery of aluminum from scrap.

The rapid growth of the industry is indicated by the figures below:

Year	Number of Establishments	Wage Earners (Average for Year)
1914	37	4,614
1921	87	9,584
1927	139	14,798
1935	170	19,271
1937	153	23,695

Filers, Grinders, Buffers, and Polishers

These finishers of metal products have become of increasing importance as the amount and diversity of metal manufactures have grown. The census permits segregation of these workers since 1910, when 49,525 such persons were listed. In 1930, their number had increased to 78,600. From 1910 to

⁶⁰ *Biennial Census of Manufactures, 1921*, p. 991; *1927*, p. 988; *1935*, p. 979. *Census of Manufactures, 1937*, "Nonferrous Metals," p. 17.

1920, there were 10,260 new workers added, while from 1920 to 1930 the increase was 18,815. This group benefits materially by the increased production of metal manufactures, because machines for making and finishing many products have not been sufficiently perfected as yet to give the final polish to such products. While hand operations are seldom used in modern industry for filing, grinding, buffing, and polishing—since machinery has been introduced to facilitate this finishing work especially in the last two decades—there is, however, a growing demand for machine operatives of this latter type. Only if and when machines become wholly automatic, which in view of the work required is not immediately probable, will such operatives face the prospect of an actual decline in numbers.

How the subdivisions of this group have developed may be seen in the following figures:

Group	1910	1920	1930
Filers	10,236	10,959	16,593
Grinders	8,793	18,315	26,801
Buffers and Polishers	30,496	30,511	35,206

It is apparent that while the numbers in all divisions are increasing, grinders have made an unusual expansion in the twenty years indicated. Filers, grinders, buffers, and polishers were .16 per cent of the total gainfully employed in 1930, .57 per cent of the Manufacturing and Mechanical category, and 26.6 per cent of the workers in the Metals group. That they are only a fraction of one per cent of all manufacturing and mechanical workers indicates their numerical unimportance in American manufacture. Even though they continue their present rate of growth, which is probable in view of the increasing mechanization of industry and the increased output of manufacture, they comprise another of those expanding groups which are too small to influence substantially either the development of the labor force used in manufacturing or the development of the total of gainful workers.

H. LEATHER INDUSTRIES

General Characteristics (Tables 114 to 118)

The following group of workers were listed in the leather industry in 1930.

	Operatives Percentage	Operatives and Laborers Percentage
Shoemakers, Cobblers, and Shoe Factories..	83.3	79.7
Tanneries	8.4	12.0
Leather Belts and Leather Goods	4.8	4.8
Harness and Saddles	2.1	2.0
Trunks, Suitcases, and Bags	1.4	1.5
	<hr/> 100.0	<hr/> 100.0

Ninety per cent of the total production of leather for manufacture goes into the making of wearing apparel such as shoes, gloves, and garments. The remaining 10 per cent is used in the manufacture of harness and saddles, leather belting, automobile and other upholstery, novelties, and travel luggage.⁶¹ In 1930 workers in the leather industry (excepting 38,601 unskilled laborers listed elsewhere) totaled 343,906 persons. This was .28 per cent of the total population, .7 per cent of the total gainful workers, and 2.5 per cent of the workers in mechanical and manufacturing pursuits.

The production and manufacture of leather is an ancient art. In the United States the years before the Civil War were characterized by hand operations both in tanning and in manufacture of leather products. But from 1860,⁶² when the McKay sewing machine for sewing soles and uppers of shoes was put into practical use, until about 1880, a rapid succession of inventions made possible the mechanization of leather manufacture and created the factory system.

The tanning of leather is still largely a skilled hand process relatively little influenced by machine technology. All other branches of the leather industry have felt the effects of labor-saving machinery which has increased output considerably and affected the number and kinds of workers required.

When a particular industry has been fortunate enough to experience an expanding market demand, as has been the case with the shoe industry, even the introduction of much labor-saving machinery will not result in a substantial reduction in the number of workers. However, the kind of workers used as machine operatives in the making of shoes is quite different from that of an earlier day. When public policy results in a

⁶¹ John R. Arnold, "Labor Productivity in the Leather Industry," *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, July 1937, p. 70. Reprinted as WPA National Research Project, Report No. B-1, October 1937.

⁶² House Document No. 77, 57th Congress, 1st Session, 1901-1902, *Capital and Labor—Manufactures and Business*, p. 498 ff.

TABLE 114

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN THE LEATHER INDUSTRIES, 1870-1930

Group	1870	1890	1900	1910	1920	1930	
Harness and Saddles	32,817	39,960	43,480	40,101	22,650	18,135	7,164
Leather Belts and Leather Goods,	13.9	14.9	14.3	13.4	7.0	5.1	2.1
Shoemakers, Cob- blers, and Shoe Factories					11,553	17,189	16,533
					3.6	4.8	4.8
Tanneries	{ 171,127	194,079	214,575	208,903	250,580	285,084	286,316
	{ 72.3	72.3	70.6	69.9	77.5	79.6	83.3
Trunks, Suitcases, and Bags	{ 30,726	29,842	39,753	42,671	33,652	32,226	28,993
	{ 13.0	11.1	13.1	14.3	10.4	9.0	8.4
	{ 2,047	4,410	6,279	7,051	4,944	5,456	4,900
	{ .9	1.6	2.0	2.4	1.5	1.5	1.4
Total	236,717	268,291	304,087	298,726	323,379	358,090	343,906
	100.1	99.9	100.0	100.0	100.0	100.0	100.0

TABLE 115

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE LEATHER INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Harness and Saddles	32,767	38,409	42,647	39,506	21,958	17,573	6,890
Leather Belts and Leather Goods,....	14.4	15.7	15.9	15.5	8.5	6.4	2.7
Shoemakers, Cobblers, and Shoe Factories					8,473	12,809	11,080
					3.3	4.7	4.4
Tanneries	{ 61,485	173,072	180,871	169,393	190,532	211,412	204,504
	{ 71.2	70.6	67.4	66.4	74.1	76.9	81.2
Trunks, Suitcases, and Bags	{ 30,641	29,642	39,461	40,917	31,746	28,598	25,395
	{ 13.5	12.1	14.7	16.0	12.3	10.4	10.1
	{ 1,970	4,031	5,458	5,472	4,381	4,644	4,026
		1.6	2.0	2.1	1.7	1.7	1.6
Total	{ 226,863	245,154	268,437	255,288	257,090	275,036	251,895
	{ 100.0	100.0	100.0	100.0	99.9	100.1	100.0

considerable reduction in the number of working hours, as in the shoe industry, there may well be an increase in the number of workers used despite the advance of technology. But, if the market demand is contracting, as is true of the demand for harness and saddles, the increasing use of labor-saving devices, even in the face of shorter working hours, may result in substantial and increasing displacement of workers.

In the thirty-five years from the end of this first wave of

TABLE 116

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE LEATHER INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Harness and Saddles	{ 50	1,551	833	595	692	562	274
Leather Belts and	{ .5	6.7	2.3	1.4	1.0	.7	.3
Leather Goods .....	{ ....	....	....	....	3,080	4,380	5,453
Shoemakers, Cob- blers, and Shoe Factories .....	{ ....	....	....	....	4.6	5.3	5.9
	{ 9,642	21,007	33,704	39,510	60,048	73,672	81,812
	{ 97.8	90.8	94.5	91.0	90.6	88.7	88.9
Tanneries	{ 85	200	292	1,754	1,906	3,628	3,598
Trunks, Suitcases, and Bags	{ .9	.9	.8	4.0	2.9	4.4	3.9
	{ 77	379	821	1,579	563	812	874
	{ .8	1.6	2.3	8.6	.8	1.0	.9
Total	{ 9,854	23,137	35,650	43,438	66,289	83,054	92,011
	{ 100.0	100.0	99.9	100.0	99.9	100.1	99.9

TABLE 117

WORKERS IN THE LEATHER INDUSTRIES: PERCENTAGE OF TOTAL POPULATION,
OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFAC-
TURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.614	.535	.486	.393	.352	.339	.280
All gainful workers, male and female	1.893	1.543	1.337	1.027	.847	.860	.704
All in Manufacturing and Mechanical In- dustries	6.834	5.094	4.306	3.299	3.075	2.874	2.525
[Males of]							
All male gainful workers	2.126	1.663	1.426	1.075	.854	.832	.662
All males in Manu- facturing and Mechani- cal Industries	7.300	5.400	4.500	3.300	3.000	2.600	2.147
[Females of]							
All female gainful workers .....	.540	.870	.920	.810	.810	.970	.860
All females in Manu- facturing and Me- chanical Industries ..	2.600	3.300	3.300	3.000	3.600	4.300	4.900

mechanization until the World War few great labor-saving machines were installed, but perfections and additions were made to already existing apparatuses. The enlarged output required to meet the demands of the World War and the

relatively high cost of labor at that time were great incentives for further mechanization of the leather industry, and since 1915 many new labor-saving machines have been installed. What their effect has been will be indicated in the following treatment of each branch of the leather industry.

The Leather Industries group had grown from 236,717 in 1870, in the early stages of the mechanization of the industry, to a maximum of 358,090 in 1920 (412,729 if unskilled laborers are included) at the close of the greatly accelerated production of the War period. The number of leather workers declined from 1.89 per cent of the national labor force in 1870 to their lowest recorded proportion of that body in 1930, namely, .7 per cent. In 1870 leather workers constituted 6.8 per cent of all manufacturing and mechanical workers, but by 1930 they had dropped to 2.5 per cent of that category. If all unskilled laborers attached to the leather industry were added for 1930, the percentage for each group quoted above would be raised approximately .1 per cent when compared with all leather workers.

Within the Leather group, a markedly declining group is that of Harness and Saddle Makers. The number of tannery operatives, and that of trunk, bag, and suitcase factory operatives also decreased somewhat. But leather belt and leather goods factory operatives and shoemakers, cobblers, and shoe factory operatives, while experiencing fluctuations in successive decades, were substantially more numerous in 1930 than when first enumerated.

How the Leather group has developed comparatively may be seen in Table 118.

It would seem reasonable to suppose that as the total population of the country increased the total number of workers engaged in such a basic industry as leather manufacture would show a proportionate increase. The 60 per cent increase in quantity of leather produced for manufacture from 1870 to 1930⁶⁸ corresponds with the 66 per cent gain in workers used in tanning and manufacturing leather. However, in only the census decade 1900-1910 did the gain in number of leather workers equal the gain in total population, and in only one decade, 1910-1920, which was an abnormal war period, did it exceed the rate of growth of the total of gainful workers.

⁶⁸ John R. Arnold, "Labor Productivity in the Leather Industry," *Monthly Labor Review*, July 1937, United States Department of Labor, Bureau of Labor Statistics, Table 4, p. 73.

TABLE 118

PERCENTAGE CHANGE IN TOTAL POPULATION, TOTAL GAINFULLY EMPLOYED,
AND NUMBER OF LEATHER WORKERS, 1870-1930

Year	Total Population	Total Gainfully Employed	Leather Workers
1870.....	....	....	....
1880.....	+30.1	+39.1	+13.3
1890.....	+24.8	+30.7	+13.3
1900.....	+21.4	+27.9	-1.8
1910.....	+21.0	+31.3	{ +8.3 (+20.0)*
1920.....	+14.9	+9.0	{ +10.7 (+15.0)*
1930.....	+16.1	+17.3	{ -4.0 (-7.3)*
1930 over 1870.....	+218.4	+290.5	{ +45.3 (+66.1)*

* Figures in parentheses are corrections made to include unskilled laborers, making the series comparable throughout.

Evidently leather is a slowly declining industry. Substitute products are making inroads upon its markets in the guise of "leatherette," "rubberette," etc. Women have discarded the high-laced shoes of former generations; city men have taken to oxfords. With laborers who must work in wet surroundings rubber or composition boots take the place of the older leather "high-tops." Only luxury books are now bound in leather. Genuine leather chairs are rare. Articles in the home once made of tooled leather have been displaced by cheaper substitutes.⁶⁴

But there may be a future for leather. "Certainly the leather goods market is by no means saturated. The average American purchases one and one-half pairs of shoes per year, which could hardly be called a saturation point. The advent of machinery may bring about lower prices and thereby widen consumption. Increased consumption would necessitate greater employment."⁶⁵

Sex Composition of Leather Industries Group

The relative positions of the sexes employed in leather industries is shown in the following percentage display:

⁶⁴ "Leather Tanning," Revised, *Occupations, A Series of Vocational Studies*, NYA of Illinois, W. J. Campbell, State Director, Research Report No. 7, January 1939, pp. 21, 22.

⁶⁵ *Ibid.*, p. 23. See Table 54, above, for changes from 1929 to 1936.

Census	Percentage	
	Males	Females
1870	95.8	4.2
1880	91.4	8.6
1890	88.3	11.7
1900	85.5	14.5
1910	79.5	20.5
1920	76.8	23.2
1930	73.2	26.8

From 4.2 per cent of all leather workers in 1870 women in 1930 constituted 26.8 per cent of that labor force. In each successive decade a larger number of workers has been recorded. This expansion was the result of the introduction of the factory system and the increasing installation of power-driven machines which could be operated by semiskilled or unskilled operatives.

Eighty-nine per cent of the women in the leather industry are working in shoe factories, and it is in this part of the industry that they have made greatest gains. In 1930 women comprised 28 per cent of all shoe factory hands and a third of all workers in belt-making factories, but were of less importance in tanneries, harness- and saddle-making establishments, and luggage factories.

Male workers increased in numbers from 1870 to 1890, declined in 1900, and dropped in 1930 to a point below any census since 1890. This loss is accounted for primarily by the rapid decline of the harness- and saddle-making business, which was almost exclusively men's work. But in all other branches of the leather industry except tanneries, males are losing ground in comparison with female workers. The leather industry is becoming increasingly mechanized, and to the extent that females can accomplish the work with comparable efficiency it is likely that the trends just indicated will continue.

Harness and Saddle Factory Operatives

The Harness and Saddles group numbered 32,817 workers in 1870 and 43,480 in 1890, and declined thereafter until in 1930 only 7,164 persons were listed in this division of the leather industry. The sharp decline following 1900 evidences the advent of the automobile and the lessened use of draft animals. Harness and saddle equipment is still required in agriculture and for the Army. A luxury trade is developing in saddlery which will continue to employ a certain number

of saddle makers. There is no evidence that these needs will cause any substantial increase in the number of workers required; on the other hand, there is much evidence to support the view that machinery on farms will further supplant draft animals and that fewer harness makers will be needed.

Operatives in Leather Belt and Leather Goods Factories

Leather belting is a comparatively new industry. The census separates operatives in such factories for the decades since 1910. The expansion brought about in this industry during the war period increased the number of belt workers rapidly, but this declined somewhat in 1930 as compared with 1920. This group of workers is small, numbering only 16,533 in 1930, or .03 per cent of the total labor force of the nation. While the production of leather belting is increasing, and has considerable prospect of continuing to expand for some time as industry requires more belting equipment, the size of this group of workers is insufficient to affect the composition of the labor force seriously.

Shoemakers, Cobblers, and Shoe Factory Operatives

Despite the increased mechanization of shoemaking plants, the number of shoemakers, cobblers, and shoe factory operatives grew in each successive decade except that ending in 1900, when a small decline was noted. In the thirty years from 1870 to 1900 the number of such workers increased 37,776; in the thirty years after 1900 they increased 77,413. As was noted earlier, women have made up most of this recent increase. In comparison with the development of the total of gainful workers, the number of shoemakers, cobblers, and shoe factory operatives has declined from 1.36 per cent in 1870 to .58 per cent in 1930.

How the size of the group of all workers actually engaged in shoemaking compared with changes in other conditions in the industry is shown in Table 119.

The number of different shoe manufacturing establishments declined 16 per cent from 1899 to 1929. Even the swollen demands and lure of large profits during the World War failed to increase the number of concerns to the level of 1899. But war-time demand did increase substantially the number of workers reported on the payrolls in 1919. The gain in average number of workers employed between 1899 and 1929

TABLE 119

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WORKERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE SHOEMAKING INDUSTRY, 1899-1929*

		1909	1919		Change, 1929 over
Number of establishments ..	1,599	1,343	1,449	1,341	- 258
Percentage change .....	....	-16.0	+ 7.9	-7.5	- 16.1
Number of wage earners	141,830	185,116	211,049	205,640	63,810
Percentage change .....	....	+30.5	+ 14.0	-2.6	+ 45.0
Wages per worker	\$412	\$498	\$ 999	\$1,081	\$ 669
Percentage change		+20.8	+100.8	+8.2	+162.4
Value added by manufacture per worker	\$637	\$892	\$2,083	\$2,192	\$1,555
Percentage change		+40.0	+133.7	+5.2	+244.2

* *Census of Manufactures, 1929*, II, 802. Figures per worker computed. The net decline in the production of boots and shoes from 1929 to 1934 is estimated as only 1.8 per cent (C. A. Bliss, *op. cit.*). Establishments in 1937 numbered 1,080 and wage earners 215,438 (*Census of Manufactures, 1937*, "Wage Earners," p. 6).

was 45 per cent. As has been true of so many manufacturing industries during the past half-century, the enormous increase in the value added by manufacture has not been proportionately distributed among the several claimants to that value.

Total wages paid in the shoe industry, for example, increased 280 per cent from 1899 to 1929; but the value added by manufacture gained 399 per cent in that time. The average full-time employed worker in a shoe factory in 1899 received \$412 in money wages; by 1909 this sum had advanced to \$498; and by 1929 to \$1,081. In terms of real wages as calculated by the changes in cost-of-living estimated by the Department of Labor based on 1913 dollars, the rise in living costs by 1929 was 71 per cent, whereas the increase in money wages received from 1909 to 1929 was 140 per cent. Thus, the average full-time employed shoe factory worker experienced a gain in purchasing power during the period under review.

Tannery Operatives

As was noted earlier, the amount of leather prepared for manufacture increased approximately 60 per cent from 1870 to 1930. The number of all workers in tanneries, including unskilled laborers, however, increased only 49 per cent in that

time. The maximum number of tannery workers at any time during the past sixty years was 59,706, in 1920. The number increased from 1870 to 1920 but declined during the decade following.

In a recent survey of this occupational field, the federal government has ascertained that the output of leather per man employed in tanneries advanced approximately 25 per cent from 1923 to 1935 but that the increase noted was already taking place as a result of technological improvements which began in 1915. Tanning operations have always depended, and still depend in most of the smaller plants which dot the country, upon much skilled hand labor. From 1923 to 1935, the number of tanners actually displaced totaled 9,000. This has occurred in spite of a recent moderate expansion of the small number of women operatives. Had not the effects of practical technological changes been mitigated by the shortening of hours which took place during this time, the possible reduction would have been nearly 10,000 more.⁶⁶

This is the situation confronting the tanning industry. It is highly probable that as competition becomes keener, and the industry is concentrated into fewer and larger units, the force of technology will be felt still more. The outlook for tannery workers indicates a decline in their number as time goes on.⁶⁷

Trunk, Suitcase, and Bag Factory Operatives

This group of workers totaled 4,900 in 1930 (5,872 with unskilled laborers included), being .01 per cent of the gainfully employed. Its number increased from 2.047 in 1870 to 7.051 in 1900, dropped in 1910, increased in 1920, and declined in 1930 to a point below any previous census record since 1880. Such workers are affected somewhat by changing customs and styles. In the making of luggage, other materials of approximately equal durability and much lighter weight are being introduced as substitutes for leather. This probably will affect seriously the number of leather-luggage makers.

⁶⁶ John R. Arnold, "Labor Productivity in the Leather Industry," *Monthly Labor Review*, July 1937, United States Department of Labor, Bureau of Labor Statistics, p. 63.

⁶⁷ On this topic, see the footnote reference to page 155, above.

I. TEXTILE AND CLOTHING INDUSTRIES

The Textile and Clothing group presented in this section is made up of skilled and semiskilled persons classified by the occupational census as "operatives" in textile industries, clothing industries, and industries which, like the rayon and button factories, produce cloth or articles for use in making clothing; included in this group also are tailors, milliners, and loom fixers, whose occupations are directly related to making textiles or clothing; in some instances the group includes small numbers of apprentices.

During the first twenty-nine years of the present century the textile industry was the largest branch of American manufacture; thereafter, the value added by manufacture was slightly greater in the machinery manufacturing group.⁶⁸ Numerically, the Textile and Clothing group ranked third among all groups of skilled and semiskilled workers in the Manufacturing and Mechanical category in 1930, while common laborers in textile industries ranked seventh in numbers of all laborers in manufacturing in that year. This force of workers is so large that what occurs to it has a significant influence upon the entire working population and is of importance to our whole national economy.

General Analysis of Trends in the Number of Textile and Clothing Workers (Tables 120 to 123, Chart 10)

In 1930 the Textile and Clothing group totaled 1,746,511 persons; 731,261 or 42 per cent were males, and 1,015,250 or 58 per cent were females. This group comprised 13 per cent of the Manufacturing and Mechanical category, 3.5 per cent of the total of gainful workers, and 1.4 per cent of the total population. Textile and clothing workers decreased in number in each of the two decades following their peak number of 1,908,321 in 1910. But these losses were suffered entirely by the female members of the group, as the number of males increased in each successive decade, 1870 to 1930.

The census classification of textile workers from 1870 through 1900 shows considerable inconsistency within the various small occupational divisions which make up the

⁶⁸ Edwin G. Nourse, et al., *America's Capacity to Produce*, Brookings Institution, Washington, D. C., 1934, pp. 194 ff.

TABLE 120

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN THE TEXTILE AND CLOTHING INDUSTRIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Cotton Mills	{ 111,606 21.0	{ 169,771 20.2	{ 173,142 13.9	{ 246,391 16.3	{ 250,149 14.7 (37,804) (15.8)	{ 302,454 17.3 (76,315) (19.7)	{ 302,501 17.3 (55,519) (19.0)
Woolen and Worsted Mills	{ 58,836 11.1	{ 88,010 10.5	{ 84,109 6.8	{ 73,196 4.9	{ 105,186 5.5 (12,290) (5.9)	{ 126,418 7.2 (22,227) (7.7)	{ 101,821 5.8 (13,753) (6.1)
Silk Mills	{ 3,256 .6	{ 18,071 2.1	{ 34,855 2.8	{ 54,460 3.6	{ 79,379 4.2 (3,798) (4.1)	{ 115,721 6.6 (10,080) (6.6)	{ 125,770 7.2 (11,078) (7.2)
Rayon Factories	{	{	{	{	{	{	{ 20,940 1.2 (4,962) (1.4)
Knitting Mills	{ 3,653 .7	{ 12,194 1.4	{ 29,555 2.4	{ 47,120 3.1	{ 87,866 4.6 (7,804) (4.8)	{ 107,604 6.1 (11,943) (6.2)	{ 134,006 7.7 (9,412) (7.6)
Carpet Mills	{ 15,669 2.9	{ 17,068 2.0	{ 22,302 1.8	{ 26,617 1.8	{ 37,347 2.0 (3,769) (2.0)	{ 23,387 1.3 (3,953) (1.4)	{ 23,609 1.6 (4,828) (1.8)
Hemp, Jute, and Linen Mills	{	{	{	{	{ 6,605 .3 (2,200) (.4)	{ 6,742 .4 (1,712) (.4)	{ 4,503 .3 (961) (.3)
Rope and Cordage Factories	{ 2,075 .5	{ 3,514 .4	{ 8,001 .6	{ 7,591 .5	{ 6,517 .3 (3,797) (.5)	{ 8,454 .5 (4,268) (.7)	{ 5,469 .3 (2,921) (.4)
Sail, Awning, and Tent Factories	{ 2,309 .4	{ 2,950 .4	{ 3,257 .3	{ 3,577 .2	{ 3,365 .2 (264) (.2)	{ 3,543 .2 (288) (.2)	{ 4,275 .2 (721) (.3)
Lace and Embroidery Mills	{	{ 1,708 .2	{ 5,256 .4	{ 9,212 .6	{ 16,027 .8 (705) (.8)	{ 19,083 1.1 (944) (1.0)	{ 11,417 .7 (569) (.6)

* Figures in parentheses show the number of laborers in each specified industry; percentages in parentheses include laborers.

TABLE 120 (Continued)

Group	1870	1880	1890	1900	1910	1920	1930
Loom Fixers	{	{	{	{	13,254 .7 (.7)	15,961 .9 (.8)	19,215 1.1 (1.0)
Textile Dyeing, Finishing, and Printing Mills.....	{ 8,639 1.6	{ 13,641 1.6	{ 20,911 1.7	{ 28,334 1.9	30,421 1.6 (9,958) (2.0)	32,845 1.9 (10,605) (2.3)	37,332 2.1 (7,571) (2.4)
Shirt, Collar, and Cuff Factories	{ 4,080 .8	{ 11,823 1.4	{ 21,107 1.7	{ 39,432 2.6	60,169 3.2 (2,184) (3.1)	52,377 3.0 (2,708) (2.9)	55,471 3.2 (4,136) (3.2)
Suit, Coat, and Overall Factories	{	{	{	{	138,042 7.2 (2,920) (7.0)	143,872 8.2 (3,984) (7.7)	106,773 6.1 (3,794) (5.9)
Hat Factories	{ 12,625 2.4	{ 16,860 2.0	{ 24,013 1.9	{ 22,733 1.5	33,020 1.7 (1,759) (1.7)	21,178 1.2 (989) (1.2)	26,454 1.5 (1,142) (1.5)
Milliners and Millinery Dealers	{ 21,323 4.0	{ 35,194 4.2	{ 61,686 5.0	{ 87,859 5.8	127,906 6.7 (6.4)	73,255 4.2 (3.8)	44,948 2.6 (2.4)
Glove Factories	{ 2,329 .4	{ 4,511 .5	{ 6,416 .5	{ 12,271 .8	19,339 1.0 (870) (1.0)	23,367 1.3 (1,757) (1.3)	18,465 1.1 (1,159) (1.0)
Corset Factories	{	{ 4,660 .6	{ 6,533 .5	{ 8,016 .5	13,073 .7 (834) (.7)	12,642 .7 (771) (.7)	10,921 6 (350) (.6)
Button Factories	{ 1,272 .2	{ 4,872 .6	{ 2,601 .2	{ 6,621 .5	11,461 .6 (1,105) (.6)	12,977 .7 (1,407) (.8)	7,565 4 (1,129) (.4)
Tailors and Tailoresses	{ 80,995 15.2	{ 133,756 15.9	{ 188,025 15.1	{ 229,649 15.2	204,608 10.7 (10.2)	192,232 11.0 (10.0)	169,283 9.7 (9.0)
Dressmakers and Seam- stresses	{ 151,581 28.5	{ 250,207 29.7	{ 443,548 35.7	{ 497,826 33.0	449,342 23.5 (22.4)	235,855 13.5 (12.3)	158,380 9.1 (8.4)
Other Textile and Clothing Industries	{ 50,910 9.6	{ 52,508 6.2	{ 107,171 8.6	{ 106,438 7.1	185,245 9.7 (6,430) (9.6)	221,516 12.6 (13,547) (12.2)	352,393 20.2 (17,911) (19.6)
Total	{ 531,763 99.9	{ 841,313 99.9	{ 1,242,468 99.9	{ 1,507,893 99.9	1,908,321 (98,491) 99.9	1,751,473 (167,493) 99.9	1,746,511 (141,916) 100.0

TABLE 121

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
THE TEXTILE AND CLOTHING INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	
Cotton Mills	47,208 21.1	78,292 25.4	80,177 20.1	125,788 25.2	21.2	21.9	156,818 21.4
Woolen and Worsted Mills	6,060 16.1	52,504 17.0	42,566 11.9	53,130 8.5	64,708 8.1	52,761 9.2	7.2
Silk Mills	954 .4	14,192 8.6	22,023 4.4	29,019 4.4	42,958 6.1	7.1	10,087 1.4
Rayon Factories	1,664 .7	4,334 1.4	8,745 2.2	12,630 2.5	22,528 3.4	26,922 3.8	44,203 6.0
Knitting Mills	9,962 4.6	11,546 3.2	12,287 2.9	17,655 2.5	13,008 2.7	16,486 1.9	2.3
Carpet Mills					2,710 .4	2,811 .4	2,074 .3
Hemp, Jute, and Linen Mills							
Rope and Cordage Fac- tories	2,345 1.0	3,040 1.0	4,896 1.2	4,592 .9	3,022 .5	4,714 .7	3,067 .4
Sail, Awning, and Tent Factories	2,278 1.0	2,843 .9	3,006 .8	3,168 .6	2,324 .4	2,566 .4	4,221 .6
Lace and Embroidery Mills		254 .1	821 .2	1,944 .4			
Loom Fixers					13,254 2.0	15,958 2.3	19,180 2.6
Textile Dyeing, Finishing, and Printing Mills.....	7,368 3.3	11,891 3.9	4.4	25,456 5.1	24,564 3.7	27,132 3.9	51,372 4.3
Shirt, Collar, and Cuff Factories		3,163 1.0	5,132 1.3	8,491 1.7	13,311 2.0	10,361 1.5	9,708 1.3
Suit, Coat, and Overall Factories					75,444 11.5	79,357 11.3	50,190 6.9
Hat Factories	9,275 4.2	13,004 4.2	17,319 4.3	15,110 3.0	22,702 3.5	14,716 2.1	17,981 2.5
Milliners and Millinery Dealers		250 .1	395 .1	1,739 .3	5,459 .8	3,657 .5	4,846 .7
Glove Factories	1,110 .5	2,568 .8	2,741 .7	4,503 .9	5,353 .8	6,584 .9	4,955 .7
Corset Factories .....	.....3	795 .3	733 .2	815 .2	1,375 .2	1,115 .2	852 .1
Button Factories .....	.....8	2,480 .8	1,011 .3	3,511 .7	6,682 1.0	7,768 1.1	4,496 .6
Tailors and Tailoresses	63,501 28.4	81,658 26.5	123,516 31.0	160,714 32.2	163,795 24.9	160,404	147,476 20.2
Dressmakers and Seam- stresses	2,517 1.1	3,223 1.0	4,837 1.2	6,927 1.4	1,582 .2		452 .1
Other Textile and Clothing Industries		29,370 9.5	54,675 13.7	47,484 9.5	48,983 7.5	56,483 8.1	95,390 13.0
Total				499,748 100.0	656,671 99.9	700,870 100.1	731,261 100.1

* Less than .001 per cent.

TABLE 122

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE TEXTILE AND CLOTHING INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Cotton Mills	64,398 20.9	91,479 17.2	92,965 11.0	120,608 12.0	140,666 11.2	149,185 14.2	145,688 14.4
Woolen and Worsted Mills	22,776 7.4	35,506 6.7	36,471 4.3	30,630 3.0	52,056 4.2	61,715 5.9	49,060 4.8
Silk Mills	2,302 .7	9,211 1.7	20,668 2.4	32,437 3.2	50,360 4.0	72,768 6.9	73,660 7.3
Rayon Factories .....	.....	.....	.....	.....	.....	.....	10,853 1.1
Knitting Mills	1,989 .6	7,860 1.5	20,810 2.5	34,490 3.4	65,338 5.2	80,682 7.7	89,803 8.8
Carpet Mills	5,377 1.7	7,106 1.3	10,756 1.3	14,330 1.4	19,692 1.6	10,884 1.0	12,123 1.2
Hemp, Jute, and Linen Mills .....	.....	.....	.....	.....	3,895 .3	3,931 .4	2,429 .2
Rope and Cordage Fac- tories	330 .1	474 .1	3,105 .4	2,999 .3	3,495 .3	3,740 .4	2,402 .2
Sail, Awning, and Tent Factories	31 ^a	107 ^a	251 ^a	409 ^a	1,041 .1	1,005 .1	1,709 .2
Lace and Embroidery Mills .....	.....	1,454 .3	4,435 .5	7,268 .7	11,691 .9	12,997 1.2	7,196 .7
Loom Fixers .....	.....	.....	.....	.....	.....	3	35
Textile Dyeing, Finishing, and Printing Mills	1,271 .4	1,750 .3	3,246 .4	2,878 .3	5,837 .5	5,713 .5	5,960 .6
Shirt, Collar, and Cuff Factories	2,812 .9	8,660 1.6	15,975 1.9	30,941 3.1	46,858 3.7	42,016 4.0	45,763 4.5
Suit, Coat, and Overall Factories .....	.....	.....	.....	.....	62,598 5.0	64,515 6.1	56,583 5.6
Hat Factories	3,350 1.1	3,856 .7	6,694 .8	7,623 .8	10,318 .8	6,462 .6	8,473 .8
Milliners and Millinery Dealers	21,129 6.9	34,944 6.6	61,291 7.3	86,120 8.5	122,447 9.8	69,598 6.6	40,102 3.9
Glove Factories	1,219 .4	1,953 .4	3,675 .4	7,768 .8	13,966 1.1	16,773 1.6	13,510 1.3
Corset Factories .....	.....	3,865 .7	5,800 .7	7,201 .7	11,698 .9	11,527 1.1	10,069 1.0
Button Factories	536 .2	2,392 .4	1,590 .2	3,110 .3	4,779 .4	5,209 .5	3,069 .3
Tailors and Tailoresses	17,494 5.7	52,098 9.8	64,509 7.6	68,935 6.8	40,813 3.3	31,823 3.0	21,807 2.1
Dressmakers and Seam- stresses	149,064 48.4	246,984 46.4	438,711 52.0	490,899 48.7	447,760 35.8	235,519 22.4	157,928 15.6
Other Textile and Clothing Industries	14,052 4.6	23,133 4.3	52,496 6.2	59,004 5.9	136,302 10.9	165,083 15.7	257,003 25.3
Total	308,130 100.0	532,832 100.0	843,443 99.9	1,007,645 99.9	1,251,650 100.0	1,050,603 99.9	1,015,250 99.9

Less than .001 per cent.

TABLE 123

WORKERS IN TEXTILE AND CLOTHING INDUSTRIES: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930*

Base	1870	1890	1900	1910	1920	
Total population	1.379	677	1.984	1.984	2.075 (2.181)	1.657 (1.815) 1.423 (1.538)
All gainful workers, male and female	4.252	837	5.465	5.185	5.000 (5.257)	4.209 (4.611) 3.577 (3.867)
All in Manufacturing and Mechanical In- dustries	15.352	15.973	17.596	16.647	{ 18.149 (19.085)	14.059 (15.404) 12.822 (13.864)
[Males of]						
All male gainful workers	2.096	2.092	2.120	2.104	2.182	2.120 1.920
All males in Manufac- turing and Mechani- cal Industries	7.200	6.700	6.700	6.600	7.600	6.700 6.200
[Females of]						
All female gainful workers	16.780	20.128	21.546	18.943	15.499	12.288 9.442
All females in Manu- facturing and Me- chanical Industries .	82.121	76.864	78.018	70.301	68.839	54.441 53.825

* Figures in parentheses include laborers.

Textile and Clothing group. For example, the group called "dressmakers" in 1900 had a different caption in each previous decade; persons listed as "lace and embroidery makers" in 1900 and 1890 were called "lace makers" in 1880 and "embroiderers, lace manufacturers" in 1870. Again, the records prior to 1910 are not clear as to the location of the laborers attached to textile and clothing industries; the proportion of laborers included in the various occupational groups, and the proportion attached to the general body of laborers in Domestic and Personal Service cannot be ascertained. Nevertheless, the Textile and Clothing group as treated here, taken as a whole, embraces such a large portion of all textile and clothing workers for the earlier periods as to give a reasonably accurate record for use in comparing the earlier with the later decades.

The Textile and Clothing Industries Relative to Growth of Population and Gainful Workers

Table 124 shows the rates of increases for the number of all workers in the group and for each sex in comparison with

TABLE 124

PERCENTAGE CHANGE IN TOTAL POPULATION, TOTAL GAINFULLY EMPLOYED,
AND NUMBER OF TEXTILE AND CLOTHING WORKERS, 1870-1930

Year	Total Population	Total Gainfully Employed	Textile and Clothing Workers		
			Total	Males	Females
1870 .....	....	....	....	....	....
1880	+ 30.1	+ 39.1	+ 58.2	+ 37.9	+ 72.9
1890	+ 24.8	+ 30.7	+ 47.7	+ 29.4	+ 58.3
1900	+ 21.4	+ 27.9	+ 21.3	+ 25.2	+ 19.5
1910	{ + 21.0 { (+ 21.0)*	{ + 31.3 { (+ 28.1)*	{ + 26.6 { (+ 33.1)*	+ 31.4	+ 24.2
1920	{ + 14.9 { (+ 15.0)	{ + 9.0 { (+ 11.7)	{ - 8.2 { (- 4.3)	+ 6.7	- 16.1
1930	{ + 16.1 { (+ 16.1)	{ + 17.3 { (+ 17.3)	{ - 0.3 { (- 1.5)	+ 4.3	- 3.4
1930 over 1870..	{ + 218.4 { (+208.3)	{ +290.5 { (+290.5)	{ +228.4 { (+255.1)	+227.0	+229.5

* Statistical revision of the census, as indicated in chapter 1, above.

the decennial increases of all gainful workers, and with those of the total population from 1870 to 1930.

In 1880, 1890, and 1910 the increase in the Textile and Clothing group exceeded appreciably the rate of increase of the total population, but only the 1880 and 1890 records noted a relative increase in the number of textile workers greater than that in the total labor force.

The fact that most common laborers in textiles are men and that the figures prior to 1910 probably included some laborers would have a bearing on the change in proportion of males and females in the Textile and Clothing group from 1900 to 1910. However, the trend of female workers is accounted for primarily by the drastic reduction in the number of seamstresses and dressmakers, and is probably somewhat influenced by technological changes in cotton textile factories⁶⁰ which affected principally female machine operators.

Table 125 gives a breakdown of laborers in Textile and Clothing arranged according to the branch of the industry in which they are engaged.

Whether the figures on laborers are added or the figures for operatives and skilled workers are taken separately for the

⁶⁰ Boris Stern, "Mechanical Changes in the Cotton Textile Industry, 1910 to 1936," *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, August 1937, p. 316.

TABLE 125

LABORERS IN TEXTILE AND CLOTHING INDUSTRIES, 1910-1930

Industry	1910	1920	1930
Cotton Mills	37,804	76,315	55,519
Woolen and Worsted Mills	12,290	22,227	13,753
Silk Mills	3,798	10,080	11,078
Rayon Factories .....	.....	.....	4,962
Knitting Mills	7,804	11,943	9,412
Carpet Mills	3,769	3,953	4,828
Hemp, Jute, and Linen Mills	2,200	1,712	961
Rope and Cordage Factories	3,797	4,268	2,921
Sail, Awning, and Tent Factories	264	283	721
Lace and Embroidery Mills	705	944	569
Textile, Dyeing, Finishing, and Printing Mills	9,958	10,605	7,571
Shirt, Collar, and Cuff Factories	2,184	2,708	4,136
Suit, Coat, and Overall Factories	2,920	3,984	3,794
Hat Factories (felt)	1,759	989	1,142
Glove Factories	870	1,757	1,159
Corset Factories	834	771	350
Button Factories	1,105	1,407	1,129
Other Textile and Clothing Workers	6,430	13,547	17,911
Total	98,491	167,493	141,916
Percentage of all Textile Workers....	4.9	8.7	7.5

* Not listed.

years for which records are available—1910, 1920, and 1930—the ratio of the Textile and Clothing group to the total population, to all gainful workers, and to the Manufacturing and Mechanical category does not change in any marked degree. This may be readily seen from Table 123, where the percentages in parentheses show the change that occurs when laborers are included. The greatest variation due to inclusion of laborers in the Textile and Clothing group is found in 1920, when the comparison with the total population shows a difference of .26 per cent, that with all gainful workers a difference of .4 per cent, and that with the Manufacturing and Mechanical category a difference of 1.34 per cent. Table 120 indicates which of the 22 subgroups have numerical importance in textile occupations, their development in relation to each other, and their proportion of the total Textile and Clothing group in successive decades.

Summary of the Subgroups in Textiles

The four major subgroups in Textile and Clothing contain a single kind or class of workers throughout the entire period being considered. The Cotton Mills group led in size for the

whole sixty years, being 17 per cent of all textile workers in 1930. Knitting Mills was second with 7.7 per cent, Silk Mills third with 7.2 per cent, and Woolen and Worsted Mills fourth with 5.8 per cent of the group.

These four groups of mill operatives comprised from a fourth to more than a third of all clothing and textile workers from 1870 to 1930. The proportion that the total of these four groups was of Textile and Clothing Industries has remained approximately the same from 1870 to 1930. But certain changes have occurred within these groups which have altered their relative importance. The cotton mills operatives have remained a greater proportion of the group in all decades from 1870 to 1930 than either knitting, silk, or woolen mills operatives. In all decades except that of 1920-1930 woolen and worsted mill operatives maintained second place; silk mills and knitting mill operatives maintained very similar proportions throughout, each having comprised but a minor fraction of the Textile and Clothing group in 1870 and each having made a steady advance to exceed finally the woolen and worsted operatives in 1930.

Sex Composition of the Textile and Clothing Group

The relative positions of the sexes employed in textile and clothing industries is shown in the following tabulation:

Census	Percentage	
	Males	Females
1870	42.1	57.9
1880	36.7	63.3
1890	32.1	67.9
1900	33.2	66.8
1910	34.4	65.6
1920	40.0	60.0
1930	41.9	58.1

It was stated previously that the very great reduction in the number of female seamstresses and dressmakers has been responsible for the shift in the sex composition of the group. The number of female dressmakers and seamstresses reached a maximum of 490,899 in 1900, but numbered only 157,928 in 1930. If these workers are omitted for the moment in the calculations which determine the sex composition of the textile occupations—as they are primarily domestic workers and not factory operatives—a different trend is seen. For example, in

comparing the percentage of males and of females engaged in textile work since 1890, excluding seamstresses and dress-makers, the following figures are obtained:

Census	Percentage	
	Males	Females
1890	49.3	50.7
1900	48.8	51.2
1910	44.9	55.1
1920	46.2	53.8
1930	46.0	54.0

Thus, instead of male workers becoming proportionately more numerous than females in the textile industry, the reverse is true when dressmakers and seamstresses are disregarded.

Cotton Mills

The workers considered are those classified by the occupational censuses as "operatives," for all decades being studied. The total number of such workers increased in successive decades, from 111,606 in 1870 to a peak of 302,501 in 1930. The number remained almost stationary from 1920 to 1930. In 1930 operatives in cotton mills comprised .6 per cent of the total of gainful workers, 2.2 per cent of the Manufacturing and Mechanical category, and 17 per cent of the Textile and Clothing group. More occupations in cotton mills required male workers, which accounts for the total increase just observed, although the number of female operatives in cotton mills declined steadily after 1910.

Male cotton mill operatives constituted 1.3 per cent of males in the Manufacturing and Mechanical group and 21 per cent of the male Textile and Clothing group in 1930. Female cotton mill operatives were 7.7 per cent of the females in Textile and Clothing. The Cotton Mills subgroup did not increase in relation to the total of gainful workers, for it comprised relatively less of the national labor force in 1930 than in any previous census since 1870.

In his excellent summary of industrial mechanization, Harry Jerome has pointed out that a relatively high degree of mechanization was reached in the manufacture of cotton cloth even before the World War.⁷⁰ However, current production

⁷⁰ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, pp. 80 ff.

of cotton cloth and mill products does not represent the ultimate practical use of available mechanization, for the extent to which this new equipment will be employed to increase production does not depend wholly upon the capacity of available productive machinery and man power. Instead, it depends upon economic factors associated with purchasing power in industry and among consumers. There are mills that are producing cloth under very unfavorable labor conditions and using relatively primitive machinery, and other mills that provide good working environments and employ the most up-to-date mechanical improvements. This condition suggests what the installation of modern equipment will mean to the labor force engaged in textile manufacture.

In Boris Stern's "Mechanical Changes in the Cotton-Textile Industry, 1910 to 1936," an excellent summary is given of a study on labor productivity in the textile industry. The figures on increased production in plants using the most advanced labor-saving machinery are reproduced in Table 126.⁷¹

TABLE 126
PERCENTAGE INCREASE IN MAN-HOUR OUTPUT OF COTTON TEXTILE MILLS
IN 1936 AS COMPARED WITH THAT OF 1910

Department of Mill	Product of Mill							
	Carded Broad- cloth	Combed Broad- cloth	Sheet- ing	Sateen	Flan- nel	Print	Lawn	Terry Cloth
Carding	85.12	101.86	112.49	81.39	95.92	93.05	100.00	112.30
Spinning	32.21	31.58	38.89	32.75	32.54	37.35	43.06	45.56
Spooling and warping	150.00	176.93	169.18	120.00	142.31	159.74	122.22	171.74
Slashing and drawing	50.00	37.49	60.00	42.86	57.13	66.67	16.69	65.56
Weaving	48.43	60.00	37.78	47.30	50.56	41.24	184.90	290.62
Cloth room	11.77	15.38	22.22	14.29	22.22	15.34	20.05	2.99

When the increase in productivity which occurred in highly mechanized mills from 1910 to 1936 is considered, some idea can be gained of the amount of goods that could have been produced had the best methods of operation been followed generally. If the 1936 demand for cotton cloth had been no greater than the 1910 demand, the enormously increased per-man productivity would have permitted the release of a very

⁷¹ Boris Stern, "Mechanical Changes in the Cotton-Textile Industry, 1910 to 1936," *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, August 1937, p. 319; reprinted as WPA National Research Project, Report No. B-2, October 1937.

substantial part of the labor force engaged in textile manufacture. This is the possibility if the trend toward mechanization continues to the point where most plants achieve a level of production comparable with that now found in the most efficient mills. The other alternative is an expanded production based upon an enlarged buying power among consumers, or a greatly increased use of textiles. Both these forces were at work, with the result that not only was the number of operatives in textile mills maintained but an increase was effected despite the growing tendency toward mechanization and improvement in managerial techniques.

However, textile production increased much more rapidly than the labor force used in that production. Because acute competition and concentration into larger units⁷² tend to force the introduction of mechanical devices, textile laborers face even greater reductions in their number as time goes on. The day is approaching when the average plant will attain a measure of efficiency comparable with that found in the better plants at the present time.

The best mills operating in 1910, when compared with those operating in 1936, showed a man-hour output of finished product (gray cloth) as shown in Table 127.⁷³

Here is another measure of increased productivity in cotton textile manufacture which further supports the view already

TABLE 127
MAN-HOUR OUTPUT OF FINISHED PRODUCT IN 1910 COMPARED
WITH THAT OF 1936

Product	Percentage of Total Yards of Cloth		Percentage Increase
	1910		
Carded broadcloth .	16.30	24.40	49.69
Combed broadcloth .	10.60	17.04	60.75
Sheeting	15.80	24.56	55.44
Carded-filling sateen	13.14	19.28	46.74
Canton flannel	13.55	21.44	58.21
Print cloth	12.20	18.48	51.50
Lawn	8.28	15.75	90.20
Terry cloth	10.79	27.17	151.80

⁷² Harry W. Laidler, *Concentration in American Industry*, Thomas Y. Crowell Company, New York, 1931, p. 245.

⁷³ Boris Stern, "Mechanical Changes in the Cotton-Textile Industry, 1910 to 1936," *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, August 1937, p. 4.

expressed that only a very great increase in production can offset the development of technology sufficiently to maintain the present labor force. Even in those mills which have automatic or semiautomatic machinery, the textile slump of the postwar period forced reorganization of plants and specialization of workers' operations, resulting in savings as high as 28 per cent of the labor force required.⁷⁴

The manufacture of textiles calls for comparatively few skilled artisans in comparison with the number of machine tenders. The work is light but requires a certain degree of manual dexterity and watchfulness and is often very tedious. The cotton textile branch of the industry, especially, has always depended largely on female workers and minors. In 1930, despite a more generally enlightened public policy regarding child labor, more than a fifth of all cotton textile workers were younger than 20, and 12 per cent ranged from 10 to 17 years. More children from 10 to 15 years of age were employed in cotton mills than in any other branch of manufacturing,⁷⁵ the number being 8,561.⁷⁶

There is apparently little need in the textile industry for older workers, since in 1930 less than 4 per cent were 60 years of age or more as compared with 8.5 per cent in gainful employment generally. Ever since the World War the oversupply of workers has wrought havoc in the industry, with respect to employment, wages, and working conditions. Machine operatives can learn their simple tasks within a few weeks, and the pressure of workers on available jobs is so great that the vicious practice has arisen whereby apprentices in some instances are not paid during their training period and as soon as they have reached the status of trained operatives are replaced by other apprentices.⁷⁷

In Table 128 certain important information is offered concerning the cotton textile industry.

The number of establishments increased 34 per cent from 1869 to 1929. Factories grew much larger during the sixty years under review, from an average of 141 workers per plant in 1869

⁷⁴ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, p. 84.

⁷⁵ *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, June 1930, pp. 1480 ff.

⁷⁶ *Fifteenth Census of the United States, 1930*, "Population," IV, 87.

⁷⁷ *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, June 1930, p. 1480 ff.

TABLE 128

NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE COTTON-GOODS INDUSTRY, 1869-1929*

	1869	1879			1909	1919	1929	Change, 1929 over
Number of establishments ...	956	756	905	973	1,208		1,281	325
Percentage change .....	....	-20.9	+19.7	+ 7.5	+24.1			+ 34.0
Wage earners (average number)	135,369	172,544	218,876	297,929	371,182	430,966	424,916	289,547
Percentage change		+27.4	+26.8	+36.1	+24.6	+ 16.1	- 1.4	+213.9
Wages per worker		\$244	\$318			\$ 825	\$ 764	\$476
Percentage change		-15.2	+30.2	-10.0	+22.3	+135.8	- 7.4	+165.2
Value added by manufacture per worker		\$506	\$517		\$677	\$1,967	\$1,474	
Percentage change		+ 4.1	+ 2.2	+14.1	+14.8	+190.5	-25.1	+203.7

* *Census of Manufactures, 1929, II, 247; Biennial Census of Manufactures, 1931, II, 225; Census of Manufactures, 1914, II, 20.* Figures per worker computed. See Table 54 above, "Cotton Goods."

to one of 331 in 1929. The maximum number of establishments was 1,375 in 1923, the decline being continuous thereafter. The number of wage earners employed in cotton textile plants increased 214 per cent from 1869 to 1929. There has been a decrease since their peak number of 471,503 in 1923.

The value added by manufacture per worker in cotton textiles increased 203 per cent from 1869 to 1929. Money wages per worker during that time increased 165 per cent.

Woolen and Worsted Mills

Woolen and worsted factory operatives comprise a major group of the textile industry, numbering 101,821 in 1930. The trend in this subgroup has been erratic, characterized by peaks and valleys which in some measure indicate the economic circumstances of the consuming public. Changes in fashions and innovations in manufacturing technique and management have also affected the trend. The number of woolen and worsted mill operatives, as well as the number of cotton mill operatives, decreased as that of silk and knitting mills operatives increased. A peak was reached in the number of woolen and worsted mill operatives in 1920, at which time this subgroup was of greater importance in the Textile and Clothing group than at any period since 1880. However, at that time the trend was upward in all textile manufacturing groups, indi-

cating that there was no particular swing toward the use of woolens to the detriment of other textiles.

In comparison with the total of gainful workers, the total population, and the Manufacturing and Mechanical category, erratic trends were recorded by the Woolen and Worsted Mills group. In 1930 this subgroup comprised only .2 per cent of the gainful workers, .08 of the total population, and .7 per cent of manufacturing and mechanical workers, being, in each case, the lowest proportion registered throughout the sixty-year period.

In Tables 129 and 130 certain important information is offered concerning the woolen and worsted industries.

TABLE 129

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE WOOLEN-GOODS INDUSTRY, 1869-1929*

	1869	1879			1919	1929	Change, 1929 over
Number of establishments	2,891	1,990	1,811	1,085	587	560	460 - 2,431
Percentage change		-31.2	-34.1	-21.1	-43.3	-4.6	-17.9 - 84.1
Wage earners (average number)	80,053		79,915		52,180	62,957	58,474 -21,579
Percentage change		+ 8.1	- 7.6	-13.7	-24.3	+ 20.6	- 7.1 - 27.0
Wages per worker	\$336	\$299	\$327	\$360	\$433	\$1,058	\$1,129 \$ 793
Percentage change		-11.0	+ 9.4	+10.0	+20.2	+144.3	+ 6.7 + 236.0
Value added by manufacture per worker	\$736		\$642	\$689	\$795		\$1,403
Percentage change		6.1	- 7.1	+ 7.3	+15.4	+193.5	8.4 + 190.5

* *Census of Manufactures, 1909*, VIII, 396; *Biennial Census of Manufactures, 1931*, p. 361. Figures per worker computed. Late figures are not comparable with those of 1929; see *Biennial Census of Manufactures, 1935, 1937*.

The number of woolen factories declined 84 per cent from 1869 to 1929. The number of workers employed in such plants dropped 27 per cent. The average woolen plant in 1869 employed 27 workers. In 1929, such a plant had 127 workers, testifying to a marked concentration in number and increase in size of plants. The value added by manufacture per worker has not kept pace with the increase recorded in money wages paid per worker.

The number of worsted-goods establishments increased 159 per cent from 1869 to 1929. The number of wage earners employed increased 585 per cent, but workers employed in this industry reached their peak number, 122,144, in 1923 and de-

TABLE 130

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE WORSTED-GOODS INDUSTRY, 1869-1929*

		1879		1899		1919	1929	Change, 1929 over
Number of establishments	102	76	143	186	324	292	264	
Percentage change		-25.5	+ 88.2	+80.1	+74.2	- 9.9	- 9.6	+158.8
Wage earners (average number)	12,920		42,978	57,008	111,012	103,880		75,566
Percentage change		+45.5	+128.6	+32.6	+94.7	- 6.5	-14.8	+584.9
Wages per worker		\$302	\$348	\$352	\$425	\$ 978	\$1,108	\$ 770
Percentage change		-10.6	+ 15.2	+ 1.1	+20.7	+130.2	+13.3	+288.0
Value added by manufacture								
per worker		\$614		\$758		\$2,529	\$2,253	\$1,650
Percentage change		+ 1.8	+ 8.0	+14.3	+24.5	+167.9	-10.8	+274.0

* *Census of Manufactures, 1909*, VIII, 396; *Biennial Census of Manufactures, 1931*, p. 362. Figures per worker computed. Late reports are not comparable with those of 1929; see *Biennial Census of Manufactures, 1935, 1937*.

creased rapidly thereafter to 1930. In this branch of the woolen industry, the increase in money wages per worker exceeded the increase in value added by manufacture per worker.⁷⁸

Silk Mills

Much that has already been said concerning conditions in textile industries is true of silk mills. This group offers clear-cut classification of operatives for all decades under review. Their number increased more rapidly in each successive decade until 1920, when the census recorded 36,000 more operatives in comparison with the number ten years earlier. The period 1920-1930, which showed a remarkable expansion in silk textiles, registered the smallest numerical gain of any census period since 1870, namely, 10,049 operatives. In comparison with the totals of population, gainful workers, and manufacturing and mechanical workers, the number of silk mill operatives increased from 1880 to 1920, then decreased very slightly. However, the percentage that this subgroup was of the total Textile and Clothing group was greater in 1930 than in 1920, this subgroup having made successive gains in this

⁷⁸ On this topic, see Boris Stern, "Mechanical Changes in Worsted and Woolen Industries, 1910-1938," *Monthly Labor Review*, January 1938, reprinted as WPA National Research Project, Report No. B-3, January 1938. See also *Ten Years of Work Experience of Philadelphia Weavers and Loom Fixers*, WPA National Research Project, Report No. P-4, July 1938. The latter reference is to woolen and worsted and carpet workers, and loom fixers. See also Table 54, above.

respect in each decade studied. It is too soon to make any observation concerning this latest trend; but if the same characteristics of other textile manufacturing occupations hold true for silk workers, a continued decline in their numerical significance in the total labor force of the nation may be expected.

The silk industry is entirely dependent upon importations for its supply of raw materials. Foreign tariffs and conditions in Asiatic countries, as well as whims of fashion and the use of substitute materials for silk, are all factors which can be expected to have their effects upon silk mill operatives from time to time.⁷⁹

In Table 131 certain useful information is given concerning the silk industry. The fact that this table deals with rayon as well as silk does not materially affect the data relating to silk mill workers.

TABLE 131

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, VALUE ADDED BY MANUFACTURE PER WORKER IN THE SILK- AND RAYON-GOODS INDUSTRY, 1869-1929*

	1879	1889	1899		1919	1929	Change, 1929 over
Number of establishments		472	483			1,491	1,405
Percentage change	+344.2	+23.6	+2.3	+76.4	+60.7	+8.9	+1,633.7
Wage earners (average number)	31,837	49,362	65,416	99,037	126,782	180,467	123,818
Percentage change	+371.3	+57.6	+32.5	+51.4	+28.0	+2.9	+1,362.2
Wages per worker			\$321	\$386	\$ 854	\$1,055	
Percentage change				+20.2	+121.2	+23.5	
Value added by manufacture							
per worker	\$592	\$735	\$685	\$900		\$2,447	\$1,786
Percentage change	-10.4	+24.1	-6.7	+31.3	+163.1	+3.3	+270.8

* *Census of Manufactures, 1909*, Vol. X, p. 151; *Biennial Census of Manufactures, 1931*, p. 292. Figures per worker computed. Late reports are not comparable with those of 1929; see *Biennial Census of Manufactures, 1935, 1937*.

The number of establishments increased 1,633 per cent from 1869 to 1929. However, the peak number was 1,659 in 1925. The average plant in 1869 employed 77 workers. By 1929 this number had increased to only 87, indicating that such establishments operate with a relatively small number of people.

⁷⁹ See an interesting article on this topic in *Fortune* for March 1935. Table 54, above, indicates that silk- and rayon-goods industries had an increased production of 8 per cent, a reduction of 3.5 per cent in employment, and an increase of 53 per cent in output per man-hour from 1929 to 1935.

The number of workers employed increased 1,862 per cent from 1869 to 1929. However, the latter data record a decline from the peak number of 132,509 in 1925. Wages per worker increased 229 per cent from 1899 to 1929, whereas value added by manufacture increased 257 per cent for the same period.

Rayon Factories (Chart 18)

The production of rayon is a comparatively new industry made possible by unusual advances in industrial chemistry.⁸⁰ Rayon is being used not only as a new material but as a substitute for other textiles. The few operatives in rayon factories in 1920 were classified by the census with "Other Not Specified Textile Mills"; in 1930 they were segregated for the first time and listed under "Chemical and Allied Industries." For the purpose of this study, rayon factory operatives are included in the Textile and Clothing Industries group. The number of rayon factory operatives was only 20,940 in 1930, or .04 per cent of all gainful workers, 1.2 per cent of the textile and clothing workers, .02 per cent of the population, and .15 of all workers in manufacturing and mechanical industries.

The number of rayon factory operatives was approximately evenly divided between males and females. Each sex maintained about the same percentage of population, of all gainful workers and of all workers in manufacturing and mechanical industries.

In spite of the fact that a new industry had been added in the field of textiles, the only textile subgroup that registered a decline in percentage of the Textile and Clothing group from 1920 to 1930 was that of Woolen and Worsted Mills. This decrease is small and in no way positively traceable to the use of rayon as a substitute. Any factors which affect adversely the importation of silk or the production of cotton or wool might easily result in simultaneous increases in the use of rayon; any

⁸⁰ A still more remarkable scientific creation is the recently announced Nylon fiber, derived from coal, water, and air. This fiber differs from rayon in that it does not require cellulose in its production and is superior to rayon by reason of its much greater elastic recovery. Other qualities claimed for the new creation are great strength, relative insensitivity to moisture, and the fineness and luster of silk. It is declared to have its greatest future usefulness in hosiery but can be used in the making of gloves, sweaters, etc. Because its diameter can be controlled at will, it is also suited to a variety of products like brush bristles, racquet strings, fishing lines, woven dress goods, velvets, and knitted and woven underwear. It can be employed as a transparent wrapping film for plastic compositions, textile finishing agents, and coated fabrics. An eight-million-dollar factory is being set up at Seaford, Delaware, which holds out the promise of a thousand new jobs at that place. The inventor, Dr. Wallace H. Carothers, since deceased, was a brilliant investigator in the employ of the Dupont Company, of Delaware. (*Science*, November 4, 1938; *Science News Letter*, October 1938.)

processes which combine rayon and other materials to advantage to make cheaper and more attractive textiles or knit goods may advance other textile industries also.

Much more goods of this nature was manufactured during the period from 1930 to 1940 than from 1920 to 1930.⁸¹ The extensive use of rayon in the manufacture of textiles, stockings, and other knit goods suggests that the labor force of this infant industry is on the threshold of a great expansion. However, rayon production will be subjected to the same technological advances that prevail in other textile industries and thus a greatly augmented production of rayon will not require a proportionate increase in the number of workers.

The available data⁸² on the rayon goods industry for 1935 are as follows:

Number of establishments.	447	Wages (thousand dollars).	54,951
Salaried officers and employees	3,435	Value of products (thousand dollars)	204,505
Wage earners' average for year	70,318	Value added by manufacturing (thousand dollars)	91,654
Salaries (thousand dollars)	7,482		

Knitting Mills

Knitting mills make use of a variety of textiles. Knitted goods were made by hand in the home until 1832, when the first successful power machines for knitting were introduced.⁸³ Since that time machines have revolutionized the manufacture of knitted underwear and opened the way for the fashioning of many kinds of wearing apparel. There has been a rapid growth in the number of knitting mill operatives recorded in each successive census, with a maximum of 134,006 persons reached in 1930. Two-thirds of these were females. Knitting mill operatives comprise .27 per cent of the gainfully employed, and their proportion of the national labor force has been growing gradually but continuously. Their number, while not large in comparison with the major groups of the census, is sufficient to have some influence upon the trend in gainful employment.

⁸¹ The percentage increase of rayon production from 1929 to 1934 is reported as 73. The corresponding figure for "silk deliveries" was -25 (C. A. Bliss, *op. cit.*).

⁸² *Biennial Census of Manufactures, 1935*, p. 376. The classification of rayon goods was altered in this census.

⁸³ *Census of Manufactures, 1900*, Vol. VII, Part I, p. cxlvii, United States Department of Commerce, Bureau of the Census.

Great development in the knitted-goods industry came with the introduction of full-fashioned hosiery. Today, more than one-third of all hosiery manufactured is full-fashioned silk or rayon. The Department of Labor reports in this connection:

Between 1914 and 1931, production of full-fashioned hosiery quadrupled twice. This increase in output has continued since 1931, from nearly 29 million dozen pairs in that year to an estimated 35 million dozen for 1936. During the early years of this phenomenal rise, there was a shortage of mechanical equipment as well as of trained operatives. As early as 1927, however, the steadily mounting productive capacity began to outdistance demand. By 1930 full-fashioned manufacture was estimated to be 30 per cent over-developed [that is, productive capacity and trained labor force in comparison with consumers' demand].⁸⁴

The figures on the number of knitting mill workers reflect these changes in wearing apparel and the shift from knitting as a part of domestic economy to a commercial activity.

The Department of Labor's report is valuable in suggesting the future course of events. Unless a rapidly increasing demand for knitted goods can be maintained, which is doubtful, the possibility of the labor force in knitting mills continuing to grow at the present rate, in the face of the introduction of more automatic machinery and the concentration of knitting mill operations in fewer large units, is quite dubious.

Table 132 gives certain useful information concerning the knitting industry.

The number of knitting mill establishments increased 661 per cent from 1869 to 1929. The average knitting mill employed 59 workers in 1869; by 1929 this number had increased to 110. The number of establishments reached a maximum of 2,323 in 1923, but the labor force employed has increased in every year recorded since 1869.

The gain in money wages paid was enormous, but even so it did not keep pace with the increase in value added by manufacture during the sixty years under review. Wages per worker increased 238 per cent and value added by manufacture per worker increased 266 per cent from 1869 to 1929.

Carpet Mills

Carpet manufacture is one of the most important branches of the woolen industry. In this country its earliest records date

⁸⁴ *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, September 1936, p. 558.

TABLE 132

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE KNIT-GOODS INDUSTRY, 1869-1929*

	1869	1879	1889		1909	1919	1929	Change, 1929 over 1869
Number of establishments ...	248	398	824	1,006	1,374	2,050	1,888	1,640
Percentage change .....	....	+ 60.5	+107.0	+22.1	+36.6	+ 49.2	- 7.9	+ 661.8
Number of wage earners ...	14,788	30,699	59,774	83,691	129,273	172,572	208,488	188,700
Percentage change .....	....	+107.6	+ 94.7	+40.0	+54.5	+ 33.5	+20.8	+1,309.8
Wages per worker	\$209	\$223	\$278	\$292	\$346	\$ 728	\$1,010	\$ 711
Percentage change .....	....	- 25.4	+ 24.6	+ 5.0	+18.5	+109.8	+39.2	+ 237.9
Value added by manufacture per worker			\$527	\$534	\$605	\$1,658	\$2,125	\$1,545
Percentage change .....	....	- 20.3	+14.1	+ 1.3	+30.2	+138.5	+28.2	+ 266.5

* *Census of Manufactures, 1909, VIII, 393; Census of Manufactures, 1929, II, 299.* Per-worker figures computed. On the circumstances of workers during the depression, see *Knitting: Reemployment of Philadelphia Hosiery Workers after Shut-Down*, WPA National Research Project, Report No. P-6, January 1938. See also Table 54, above.

back to 1791, when a carpet factory was opened in Philadelphia.⁸⁵ The number of carpet mill operatives increased steadily from 1870 to 1910, when a maximum of 37,347 workers was reached. There was a sharp decline from 1910 to 1920, when the smallest number was reported since 1890; and a recovery from 1920 to 1930, when a point was reached above that of 1900. However, at the 1930 census the number of operatives in carpet mills was almost 9,000 less than the number in 1910. During this period a concentration of small factories into large units occurred and the use of power looms resulted in an enormous increase in the output of rugs and carpets.

The increase in the number of carpet factory workers has not kept pace with the growth in the total of gainfully employed, remaining about the same from 1880 to 1910, and declining thereafter. Likewise, in comparison with the development in the Manufacturing and Mechanical category and the Textile and Clothing group, carpet factory workers have not maintained their position, indicating that they are relatively less significant in the body of gainfully employed.

The number of carpet manufacturing establishments decreased steadily from 215 in 1870 to 67 in 1929, a decline of 69 per cent in the sixty-year period.⁸⁶ The average number of

⁸⁵ *Census of Manufactures, 1900, Vol. IX, Part III, p. 104.*

⁸⁶ *Census of Manufactures, 1900, Vol. IX, Part III, p. 105; Biennial Census of Manufactures, 1931, p. 371. See Biennial Census of Manufactures, 1935, 1937.*

wage earners employed reached a maximum of 35,217 in 1923 and declined to 32,623 in 1929. For the sixty-year period, 1869-1929, the labor force employed increased 169 per cent. The average carpet manufacturing plant in 1870 employed 56 workers, but concentration of both number and size of plants occurred so rapidly that by 1929 the average plant employed 487 workers. The total wages paid in 1870 was \$4,681,718; but in 1929 the total had reached \$40,014,207, a gain of 754 per cent. The value added by manufacture had increased 330 per cent from 1899 to 1929.

Hemp, Jute, and Linen Mills

Operatives in these mills have been differentiated by the census only since 1910, various workers in hemp, jute, and linen having been listed in different miscellaneous groups prior to that date. Hence, the available data are too meager for picturing long-term trends. About the same number were recorded in 1920 as ten years earlier, but a considerable decline was shown in 1930. In 1930 this group of workers was only .009 per cent of the total gainfully employed.

The jute-goods industry consists of manufacture of bags, yarns, and other jute products. The linen-goods industry produces articles chiefly or wholly from flax thread. The combined number of these establishments in 1909 was 39, but by 1929 they had decreased to 36. The average number of wage earners employed in 1909 was 10,237 and by 1929 this number had fallen to 7,126, a decline of 30 per cent.⁸⁷ Total money wages paid increased 82 per cent during the twenty-year period, despite the reduction in the number of workers. However, the value added by manufacture increased 107 per cent during this time.⁸⁸

Rope and Cordage Factories

Another small group of textile workers consists of the operatives engaged in making rope and cordage. The chief output of these factories is binder twine, the amount of which is governed largely by demands fixed by the size and character of agricultural crops. Rope, cable, and cordage made of manila

⁸⁷ The corresponding figures for 1937 were: number of establishments, 44; average number of wage earners, 8,384 (*Census of Manufactures, 1937*, "Jute Goods—Linen Goods," p. 3).

⁸⁸ *Biennial Census of Manufactures, 1931*, p. 218.

hemp are next in importance; the amount of such products depends largely upon their use in commerce and industry.

Workers employed in rope and cordage factories have been subjected to technological advances which have greatly reduced the number of hand operations and consequently the number of workers. The number in this subgroup in 1900 shows a decline from the 1890 figure; in 1900 the group contained workers classified as "rope and cordage factories operatives," whereas numbers prior to 1900 were for "rope and cordage makers" and probably embraced workers who performed all tasks necessary to the making of these articles.

The number of establishments making rope and cordage increased from 105 in 1899 to 123 in 1929.⁸⁹ The gain was greatest in the period from 1909 to 1919, with an increase of 8 factories. The average number of wage earners employed in 1899 was 13,114. The maximum employment recorded was in 1919, when 17,622 workers were engaged in the manufacture of rope and cordage. By 1929 the number had fallen to 14,489. The increase from 1899 to 1929 was 10 per cent. But during this period the total money wages paid increased 212 per cent, and the value added by manufacture was 229 per cent. The vastly increased output of rope and cordage products in 1929 was accomplished with a labor force only slightly greater than that employed in the much smaller production year of 1899.

Sail, Awning, and Tent Factories

A small group of textile workers is engaged in making sails, tents, and awnings. Like many other small subgroups in the Textile and Clothing group, this subgroup embraced workmen called "makers" for the earlier decades, the makers probably including almost all workers necessary to produce these goods. For 1910, 1920, and 1930 the workers in this subgroup were classified as "operatives in sail, awning, and tent factories." The number of laborers in 1910 and in 1920 were sufficient, when added to operatives, to cause workers in this subgroup to show a very small but continual numerical increase until the 1930 census. In 1930 the number of operatives and the number of laborers had both shown a significant upturn. In the case of workers in these industries, before 1910 the numbers in the

⁸⁹ *Biennial Census of Manufactures, 1931*, p. 219. In 1937 there were 118 establishments and 14,043 wage earners (*Census of Manufactures, 1937*, "Cordage and Twine," p. 2).

occupational censuses are greater than the numbers listed in the manufacturing censuses. The reason for this is that many workers producing this merchandise in the earlier years were not in factories but in small shops engaged in the retail trade.

This group is small, however, offering occupations to only .009 per cent of all gainful workers and .2 per cent of the Textile and Clothing group. The same forces operate in connection with this group as are influencing the other textile groups—mechanization and more goods produced by fewer workers.

The number of establishments making awnings, tents, and canvas covers increased from 340 in 1899 to 1,002 in 1929, a gain of 194 per cent.⁹⁰ Most of these establishments are small artisan-proprietor businesses. The average number of wage earners employed in 1899 was 9 per establishment; by 1929 the average number was 7 workers. This decline in the average size of plant was the result of changes in wholesale methods whereby small shops were no longer required to invest in large stocks but could purchase them as needed from centrally located wholesale distributing firms. The result was that many competent artisans became proprietors of small plants who formerly were prevented from making this move owing to lack of working capital. The total money wages paid increased 445 per cent from 1899 to 1929; but the value added by manufacture increased 510 per cent.

Lace and Embroidery Mills

Lace and embroidery workers form another small subgroup of the Textile and Clothing group; in 1930 operatives in lace and embroidery mills numbered 11,417 persons, which is a somewhat larger number of workers than that listed in 1900, but smaller than that of 1910 and 1920. The number of laborers attached to these mills is insignificant and the subgroup embraces a comparable group of workers for all decades. This branch of the textile industry has also been subjected to increased mechanization. For example, lace goods was manufactured in 44 establishments in 1919 with an average employment of 6,490 workers, adding a value by manufacture of 16 million dollars. In 1929, the number of plants was 42 and the average number of wage earners employed was 6,854,⁹¹ but the

⁹⁰ *Biennial Census of Manufactures, 1931*, p. 211. Late figures are not comparable; see *Census of Manufactures, 1935, 1937*.

⁹¹ The number of establishments had increased to 57 in 1937, of wage earners to 8,109. (*Census of Manufactures, 1937*, "Lace Goods," p. 11.)

value added to the product by manufacture was 19 million dollars.

The number of lace and embroidery workers increased in proportion to the total gainfully employed from 1880 to 1920 at a very slow rate but declined in 1930. During the World War the American production of both embroideries and laces was greatly advanced because of the cessation of importations.⁹² Barring similar influences, there are no indications that the number of these workers will greatly increase, but there is evidence that technological advances may reduce their number.

Loom Fixers

As is often noted with increasing mechanization of industry, machine installations degrade certain handicrafts to the machine-tending level of semiskilled activity. However, greater mechanization also requires an increased force of skilled mechanics and machine fixers. This is particularly true in textile factories. Of course the number added as machine fixers is not commensurate with the number dropped through mechanization, and machines are introduced only if the ultimate result is a reduction in the total wage bill or an increase in output proportionately greater than the increase in labor costs.

Beginning with 1910 the census segregates loom fixers in textile mills. Their number increased gradually thereafter until in 1930 these craftsmen totaled 19,215. In comparison with the total of the gainfully employed, they are increasing very slightly. But their number is much too small for this fact to make any material difference in the growth of the nation's labor force. That they will continue to increase as mills become more highly mechanized seems probable, but it is unlikely that they will ever assume any great numerical importance.

Textile Dyeing, Finishing, and Printing Mills

By assembling all workers such as bleachers, dyers, scourers, and operatives in the dyeing, finishing, and printing mills, a comparable series is obtained for 1870 to 1930. When the figures for laborers are added to those for operatives since the

⁹² Charles R. Richards, *Art in Industry*, The Macmillan Company, New York, 1929, p. 101.

turn of the century it is seen that workers in these industries have shown rather decided numerical increases. In 1930 the skilled and semiskilled workers in this group numbered 37,332 and made up 2 per cent of the Textile and Clothing group and .08 per cent of all gainful workers.

The dyeing and finishing of textiles is carried on both in cloth factories, where it is one of the processes in preparing finished cloth, and in separate establishments entirely devoted to the processing of textiles. Observation attests the increasing use of colored cloth and a wide variety of dyes and printed patterns.

Relative to the available labor force of operatives in dyeing, printing, and finishing textiles, the number has increased in each successive decade. In comparison with the development of the total of the Textile and Clothing group the rate of growth showed a small but continual increase from 1900 to 1930. When laborers in textile dyeing and printing mills are added for 1910, 1920, and 1930, this subgroup makes up proportionately more of the Textile and Clothing group in each decade. But with the introduction of machinery some workers employed were distinctly skilled or semiskilled workers and others common laborers; whereas in the earlier years each worker performed many, if not all, tasks necessary to the dyeing, printing, and finishing of textiles. However, it is not possible to determine the number of common laborers which might be concealed within the figures for any decade prior to 1910.

The number of dyeing and finishing establishments increased from 298 in 1899 to a maximum of 743 in 1927, and declined to 732 in 1929. However, the largest number of workers employed was 79,327 in 1929, a gain of 166 per cent from 1899. The size of plant has increased slightly, from an average of 100 workers per establishment in 1899 to one of 108 in 1929. Money wages increased 640 per cent from 1899 to 1929; but the value added by manufacture increased 752 per cent.⁹⁸

Shirt, Collar, and Cuff Factories

The number of shirt, collar, and cuff workers has increased rapidly with the shift in economic conditions; the cityward movement and industrialization altered home conditions to the

⁹⁸ Late figures are not comparable with those of 1929; see *Biennial Census of Manufactures, 1935, 1937*.

extent that women no longer made such wearing apparel for the family.

Part-time employment in the home characterized the development of the collar and cuff industry, created the most shameful practices of a sweated trade, and retarded factory manufacture of this merchandise. Even today the method of contracting for labor, much of which is done in the home, has a pronounced influence on the industry, causing many persons to list themselves as shirtmakers when they are only partially employed in this capacity and are receiving meager returns which only serve to supplement the family earnings.⁸⁴ However, mechanization has advanced to such a point that factory production can be made profitable despite competition with the low wages paid by shirt contractors for making shirts in the home. If social policy should reach the point where the wage differential in favor of shirt contractors was greatly curtailed, then factory production would increase, and the industry would be subject to a greater degree of mechanization. Thus the number of workers engaged in shirtmaking would be considerably altered. Apparently this trend is already in progress.

The number of shirt workers increased from 1870 to 1910 but declined in 1920, and the small increase in 1930 failed to bring the number to the 1910 level. In comparison with the total of the gainfully employed, shirt workers increased more rapidly until 1910, but declined thereafter. Judging by the influences at work to alter labor policy, besides the lessened growth in population, technological advances in the industry, and limited buying power of consumers, there is little expectation that the trend just indicated will alter substantially. Women will be most seriously affected, since they constitute the major portion of the workers in these industries.

This subgroup, like many others in the textile industry, embraced workers classified as "makers" for the censuses prior to 1910 and operatives in factories for 1910, 1920, and 1930. The number of laborers, however, is so small that the tables on operatives can be taken as including practically all workers in these factories.

The number of shirtmaking establishments increased from 690 in 1899 to a peak of 934 in 1923, and then declined to 863

⁸⁴ "Labor in the Shirt Industry," *Monthly Labor Review*, United States Department of Labor, Bureau of Labor Statistics, September 1933, pp. 499 ff.

in 1929.⁹⁵ However, the largest number of workers employed in this industry were recorded in 1929, the number being 59,830, representing a gain of 63 per cent from 1899. Total money wages paid increased 298 per cent in that period of time, but the value added by manufacture increased 362 per cent.

The number of collar-making establishments decreased from 57 in 1899 to 15 in 1929; the average number of workers employed declined from 17,135 to 2,952, a loss of 83 per cent in the labor force.⁹⁶ This occurred during a time when the amount and value of manufactured products were declining, owing largely to changed fashions which reduced the demand for men's collars. The total money wages paid in 1899 was \$5,658,-969; by 1929 this amount had declined to \$2,263,335, a decrease of 60 per cent. During this time, the value added by manufacture had dropped 47 per cent.

Suit, Coat, and Overall Factories

Figures for operatives in suit, coat, and overall factories have been segregated by the census since 1900. The population has grown considerably since that time, and the number of persons dependent upon ready-to-wear clothing has likewise grown. While the number of garments manufactured has increased, there was an actual decline in the number of clothing workers recorded in 1930 as compared with 1910. The number of laborers in these factories is extremely small. Mechanization in factories advanced rapidly during the twenty years. Inventions such as multiple pile cutters, and power-driven sewing machines greatly increased workers' productivity.

In comparison with the development of the total of the gainfully employed, the trend of these clothing workers was downward. Nor is there any reason, as judged by prevailing conditions, to believe that any other trend will be noted in the immediate future. The peak labor force of 144,000 in 1920 was the result of war-time expansion in the clothing industry; when the 1920 census was taken, many workers, although listing themselves as operatives in suit, coat, or overall factories,

⁹⁵ *Biennial Census of Manufactures, 1931*, p. 351. While the figures from 1933 to 1937 are not precisely comparable with those of 1929, because of changes in classification, it may be noted that the number of establishments declined from 585 in 1933, to 546 in 1935, and to 529 in 1937, while the average number of wage earners increased from 53,816, to 59,944, and to 67,594 for the same years (*Census of Manufactures, 1937*, "Shirts and Nightwear"; *Biennial Census of Manufactures, 1933, and 1935*).

⁹⁶ *Biennial Census of Manufactures, 1931*, p. 338. See *Census of Manufactures, 1935, 1937*.

were no longer actually employed. There is also some evidence that an unusual amount of labor-saving machinery was introduced to meet the demands of the prosperous 1920's when the wage bill was of growing concern to clothing manufacturers.⁸⁷

Available statistics on men's work clothing show that the 583 establishments of the year 1923 were reduced to 511 in 1929, while the number of wage earners employed on the average during the year increased from 36,647 in 1923 to 38,201 in 1929; but wages paid declined from \$28,234,741 in 1923 to \$26,647,078 in 1929.⁸⁸

Data for the women's clothing industry are shown in Table 133.

TABLE 133

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE WOMEN'S CLOTHING INDUSTRY, 1899-1929*

	1899	1909	1919	Increase, 1929 over	
Number of establishments	2,701	4,558	7,711	8,082	5,381
Percentage increase		58.8	69.2	4.8	199.2
Average number of wage earners	83,729	153,743	164,649	187,500	103,761
Percentage increase		83.6	7.7	13.2	123.9
Wages per worker	\$389	\$ 511	\$1,178	\$1,300	\$ 911
Percentage increase		31.4	130.5	10.3	234.1
Value added by manufacture per worker		\$1,145	\$3,190	\$4,135	\$3,243
Percentage increase		28.5	178.6	29.6	363.8

* *Biennial Census of Manufactures, 1931*, p. 324. Per-worker figures computed. Late figures reported are not comparable; see *Biennial Census of Manufactures, 1935, 1937*.

This table reveals that wages per worker increased 234 per cent, whereas the value added by manufacture increased 364 per cent. While there was an enormous increase in wages paid, it did not keep pace with the value added by manufacture.⁸⁹

Hat Factories

This subgroup of the Textile and Clothing group numbered 26,454 persons in 1930. Here as elsewhere the classifications

⁸⁷ R. J. Myers, "Occupational Readjustments of Displaced Skilled Workers," *Journal of Political Economy*, Vol. XXXVII, No. 4, August 1929, pp. 473-89.

⁸⁸ *Biennial Census of Manufactures, 1931*, p. 320.

⁸⁹ Useful information on this topic will be found in "Garment Industry," Revised, *Occupations, A Series of Vocational Studies*, NYA of Illinois, Research Report No. 13, November 5, 1938.

varied from decade to decade, and only operatives in "hat factories (felt)" were considered in 1910, 1920, and 1930. But the number of workers classified as laborers in this industry is too small to have any significance. The hat factories considered here are establishments engaged in making hat bodies and finished hats chiefly from wool and felt. Over two-thirds of all these hatmakers are men. The maximum number of operatives in hat factories was 33,020 in 1910, the number in 1930 being 26,454. In comparison with the growth in the total of gainfully employed, hatters maintained their position until 1890 but lost somewhat thereafter to 1930. Their number is small, and the trend does not indicate that they will either increase or decrease materially. Nor could even a sharp change in this trend seriously affect the size of the total labor force of the nation.

The number of establishments manufacturing felt hats increased from 32 in 1889 to 40 in 1919, and then declined to 14 in 1929.¹⁰⁰ The average number of wage earners employed in 1889 was 3,500; but this number had dropped to 2,028 by 1929, a decline of 42 per cent. During this time, the total money wages paid had increased 85 per cent; and the value added by manufacture grew 73 per cent.

Milliners and Millinery Dealers

This group is made up primarily of persons engaged in the manufacture of hats, both trimmed and untrimmed, hat linings, and braids. Formerly, much of this work was done in small individual establishments, but in recent years nearly all millinery work is being conducted in wholesale factories. This fact has had much to do with the trends indicated in the tables.

The number of milliners and millinery dealers grew rapidly from 1870 until 1910 but declined sharply in the two succeeding decades. In fact the number of workers was less in 1930 than in any census since 1880. The figures for 1870 and 1880 were estimated; in 1890 and 1900 the classification included milliners and apprentices; many milliners owned small shops, making their own hats and sometimes employing other milliners or apprentices. The number of custom dealers had declined considerably because of changes in merchandising in

¹⁰⁰ *Biennial Census of Manufactures, 1931*, p. 377. The number of establishments declined to 9 in 1933 and returned to 14 in 1937. The low point in the average number of wage earners was also at 1933, but the number had increased to 4,038 in 1937 (*Census of Manufactures, 1937, "Felt Hats,"* p. 16).

department stores and other large establishments which include millinery as a part of the trade. Chain-store merchandising has developed with astounding rapidity since the turn of the century, particularly since the World War, and these large retail outlets now do a very substantial part of all millinery business. This means an extension of the factory production of head gear, and a further curtailment of artisan proprietorships.

In comparison with the total of gainfully employed, the number of milliners increased until 1910, and then declined until 1930, at which time they were only .09 per cent of the national labor force, a proportion smaller than at any time during the past sixty years. There are no indications of a change in this trend, and there is some reason to believe that the period of decline is not yet over.

Fortune (January 1935) makes the statement that "the average American woman wears about \$1.95 worth of hat . . . last year at least 200 million dollars worth of women's hats were sold at retail in this country and the large majority of them sold for around \$1.95." Another authority states:

About 100 million hats are sold annually in this country; that is to say, about two hats per purchaser each year. While this number is probably more than women purchased a few years back, it is by no means a high one. It takes more than two hats per purchaser annually to lift the millinery industry free from its present shackles. Especially is this true when those two hats sell for only four dollars altogether. At five dollars per hat, two hats per purchaser yearly would mean bountiful prosperity to the industry; at two dollars, nothing but leanness and small payrolls. This seems to be a case where price decline has not resulted in any marked increase in consumption; although there is no doubt that, had this price decline not taken place, the production figure would have declined precipitously.¹⁰¹

Glove Factories

Glove factory workers increased in number from 2,329 in 1870 to their maximum of 23,357 in 1920 and declined in 1930 to a point below their number in 1910. The classifications for 1910, 1920, and 1930 were "operatives in glove factories"; in all previous censuses the classification had been "glovemakers." Separate and complete data on gloves made from cloth are not available for the years before 1919.

From 1919 to 1929 the number of factories declined 31 per cent, the average number of wage earners employed increased

¹⁰¹ From "Millinery," *Occupations, A Series of Vocational Studies*, NYA of Illinois (W. J. Campbell, State Director), 1938, p. 20.

3.3 per cent, the total wages paid increased 22 per cent, the value of the product increased 6 per cent, and the value added by manufacture declined 12 per cent.¹⁰²

In comparison with the total of the gainfully employed, the number of glove factory workers gained slightly in successive decades until 1920, but fell sharply in 1930 to a place below its relative position in 1900. In 1930 the Glove Factory group constituted only .4 per cent of the national labor force, and was too small a body of workers to make any noticeable difference in the development of the gainfully employed.

Corset Factories

The production of corsets depends largely upon style in women's dress, the acceptance of hygienic precepts, and changes in the kind of material used. In 1870 the industry included the making of hoop skirts. The number of corset factory workers, almost all of whom are females, advanced steadily from 4,660 in 1880 to 13,073 in 1910 but declined thereafter to 1930. These trends are not accounted for by change of census classification but must be attributed to the characteristic development of manufacturing in the United States, namely, a greatly expanded production without a corresponding increase in the number of workers, and a sharp concentration into fewer plants that produce the larger part of the total output. From 1899 to 1929, the number of corset factories increased 54 per cent, the average number of wage earners employed increased only 11 per cent, wages paid increased 241 per cent, and the value added by manufacture increased 403 per cent.¹⁰³

In comparison with the development of the total of the gainfully employed, corset factory hands have about maintained their relative position in successive decades, with a perceptible decline in 1930 in comparison with any former census. Since the number of these workers is so small, it is not likely that fluctuations within the group will have any marked effect upon the distribution of the total of gainfully employed.

¹⁰² *Biennial Census of Manufactures, 1931*, p. 346. The decline in number of establishments from 1929 to 1937 was from 321 to 107 and that in average number of wage earners from 19,634 to 12,679 (*Census of Manufactures, 1937*, "Glove Factories," p. 14).

¹⁰³ *Biennial Census of Manufactures, 1931*, p. 340. Late figures are not comparable with those of 1929. See *Biennial Census of Manufactures, 1935, 1937*.

Button Factories

Buttons, an indispensable part of civilized wearing apparel, came into general use during the reign of Elizabeth (1558-1603) and were being manufactured commercially in America by the end of the eighteenth century. The production has always been influenced by fashions in dress. The manufacture of buttons received a great impetus after 1875, when they were used not only to fasten clothing but also for ornamentation. Before this time, buttons were nearly all handmade; but in 1882 the automatic composition button machine was invented which made machine production possible.¹⁰⁴ From that time onward the variety and uses of buttons increased rapidly, and machine production has become largely automatic.

Not only were buttons made for use on clothing but for ceremonial and advertising purposes as well. The number of button factory workers increased sixfold between 1870 and 1930, reached a peak of 12,977 in 1920, and declined in 1930 to less than at any time since 1900. Part of this decline was undoubtedly due to the use of substitutes for buttons and to changes in fashions. The metal slide fastener is being used for an increasing number of purposes for which buttons were formerly required. Even more important has been the mechanization of the industry.

Button workers comprise only a minor part of the gainfully employed, constituting .015 per cent in 1930. Approximately 60 per cent were males, whose relative number had increased since 1900, when the sexes were about equally represented. Many operations now accomplished by machines replace the handwork which was formerly done by women in the button industry.

The number of button-making establishments increased from 238 in 1899 to 557 in 1919, and then declined to 242 in 1929. The decline was continuous from 1919 to 1931, in which year there were 212 establishments. The average number of wage earners employed grew from 8,685 in 1899 to a maximum of 16,427 in 1909 and declined to 9,034 in 1929. The total volume of money wages paid increased 212 per cent from 1899 to 1929, but the value added by manufacture increased 257 per cent in that thirty-year period.¹⁰⁵

¹⁰⁴ *Census of Manufactures, 1900*, Vol. IX, Part III, p. 322.

¹⁰⁵ By 1937 the number of establishments had risen to 291, the average number of wage earners to 12,026 (*Census of Manufactures, 1937*, "Buttons," p. 6).

Tailors and Tailoresses

In 1930 Tailors and Tailoresses was the principal subgroup of Textile and Clothing Industries not attached to factory operations. The classifications for all decades remained constant except that in 1870 some seamstresses were added by the census. Tailors and tailoresses have been subjected to the changing habits of the people with respect to wearing apparel. As the population expanded rapidly during the period following the Civil War and our urban civilization developed, an increasing number of workers were needed to make suits and overcoats. Their number grew from 133,756 in 1880 to 229,649 in 1900. The shift to factory ready-to-wear clothing caused an abrupt and startling change in the number of tailors and tailoresses required. This declined from the maximum noted in 1900 to 169,283 in 1930, when fewer workers were available than at any time since 1880.

In comparison with the total of the labor force, the number of tailors and tailoresses increased from 1870 to 1890 and declined thereafter until 1930, when they comprised .3 per cent of the total gainfully employed. Their number declined from 15 per cent of all textile workers in 1900 to 9.7 per cent in 1930. It is likely that the trend in the numerical and proportionate decrease of Tailors and Tailoresses will continue for some time, for the factors making for such a decrease are still operative.

Dressmakers and Seamstresses

This is a large subgroup of workers in the Textile and Clothing group who are not attached to factory production. The classification of such workers in successive censuses has undergone frequent change. The number of seamstresses and dressmakers increased rapidly from 1870 to 1900 but declined rapidly in the three decades following. This trend depicts the changes in making of wearing apparel from the time when most sewing was done in the home or in the home of a dressmaker to the present highly mechanized factory production of finished clothes. Against the competition of factory ready-to-wear garments, dressmaking in the home has had to give way steadily, so that in 1930 the number of dressmakers and seamstresses was less than at any census after 1870. The decline after 1900 and the notable increase in factory-made clothing

after that time point to a continuance of this trend. In fact many former home dressmakers and steamstresses are now engaged in alteration work on factory-made clothing.

In 1930, dressmakers and seamstresses comprised .3 per cent of the total of the gainfully employed; this is the smallest proportion of the total labor force recorded by the census since 1870. Dressmakers and seamstresses have declined in number from 35 per cent of all textile workers in 1890 to 9 per cent in 1930. As most dressmakers and seamstresses are women, it is important to note how they compare with the total of gainfully employed females: In 1930 they constituted 1.4 per cent of that body, a decline from 11 per cent in 1890. In the latter year they formed 52 per cent of the whole number of females in Textile and Clothing, whereas in 1930 they comprised only 15 per cent.

Other Textile and Clothing Industries

This "Other" classification will continue to embody an ever changing group of workers. As the number of workers in old occupations like "galloon, gimp, and tassel makers" dwindles, and such goods become the by-products of other industries, these classifications will be dropped. As new industries emerge, workers in them will at first be grouped under this caption of miscellaneous workers; but as these industries develop and become stabilized, the number of people employed may warrant separate classification and thus these workmen in turn will be shifted away from this miscellaneous grouping.

The number of miscellaneous textile workers has been growing since 1870, with the greatest rate of growth shown from 1900 to 1930. With respect to the total of the gainfully employed, these workers have also increased since 1900 and in 1930 constituted .72 per cent of the national labor force. Within the Textile and Clothing group such workers are likewise becoming more important, having increased from 7.2 per cent in 1900 to 20 per cent in 1930.

The subgroups which comprised Other Textile and Clothing Industries from 1870 to 1930 are as follows:

TABLE 134

CENSUS SUBGROUPS IN OTHER TEXTILE AND CLOTHING INDUSTRIES,
1870-1930

Subgroup	1870	1880	1890	1900	1910	1920	1930
Dressmakers and Milliners Apprentices ....	....	....	....	....	12,011	4,326	2,181
Other Clothing Factory Operatives.....	....	....	....	....	122,493	155,935	270,825
Other and Not Specified Textile Mill Oper- atives .....	....	....	....	....	50,741	61,255	79,387
Hemp and Jute Mill Operatives.....	706	....	....	3,519	....	....	....
Linen Mill Operatives .....	....	....	....	2,100	....	....	....
Worsted Mill Operatives .....	....	....	....	7,041	....	....	....
Textile Operatives Not Specified .....	....	....	....	78,312	....	....	....
Sewing-Machine Operators	3,042	7,505	7,126	5,772	....	....	....
Other Textile Workers Not Specified.....	....	....	....	3,727	....	....	....
Artificial-Flower Makers	1,169	3,399	3,046	2,775	....	....	....
Umbrella and Parasol Makers	1,439	1,967	3,403	3,242	....	....	....
Mill and Factory Operatives Not Specified	41,619	30,836	93,596	....	....	....	....
Bagmakers	866	1,408	....	....	....	....	....
Flax Dressers	1,046	1,894	....	....	....	....	....
Galloon, Gimp, and Tassel Makers.....	569	2,235	....	....	....	....	....
Threadmakers .....	....	3,259	....	....	....	....	....
Oilcloth Makers	454	....	....	....	....	....	....
Total	50,910	52,503	107,171	106,488	185,245	211,516	352,393

J. PAPER, PRINTING, AND ALLIED INDUSTRIES

General Characteristics (Tables 135 to 138, Chart 10)

This occupational group is made up of workers engaged in the various operations required to manufacture paper and prepare it for consumption or use and includes workers engaged in the engraving and printing of paper products. In 1910, 1920, and 1930 this group was made up of operatives in factories, and trained craftsmen; it also included a small number of apprentices. The entire group numbered 427,815 in 1930, which was .35 per cent of the total population, .87 per cent of the total of gainful workers, and 3.14 per cent of all manufacturing and mechanical pursuits. The composition of the group for 1930 is as follows:

Group	Percentage
Paper and Pulp Mills	14.9
Paper-Box Factories	3.3
Blankbook, Envelope, Tag, etc., Factories.....	4.0
Engravers	4.5
Printing, Publishing, and Allied Industries.....	73.2
Total	99.9

TABLE 135

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN THE PAPER, PRINTING, AND ALLIED INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Paper and Pulp Mills	12,469 17.2	21,430 16.7	27,817 13.9	36,328 14.3	36,383 12.6	54,669 16.3	63,629 16.0
Paper-Box Factories	6,080 8.4	15,762 12.3	17,757 8.8	21,098 8.3	17,917 6.2	20,452 6.1	14,284 3.6
Blankbook, Envelope, Tag, etc., Factories	..... .....	..... .....	..... .....	..... .....	10,032 3.5	13,694 4.1	17,127 4.3
Engravers	4,226 5.8	4,577 3.6	8,320 4.1	11,151 4.4	13,967 4.8	15,053 4.5	19,437 4.9
Printing and Pub- lishing	9,104 12.6	13,833 10.8	23,858 11.9	30,278 11.9	71,153 24.6	78,312 23.3	81,799 20.6
Printers and Lithog- raphers	40,424 55.9	72,726 56.7	123,059 61.3	155,147 61.1	160,179 48.4	172,564 45.8	231,539 50.5
Total	72,303 99.9	128,328 100.1	200,811 100.0	254,002 100.0	309,631 100.1	354,744 100.1	427,815 99.9

TABLE 136

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE PAPER, PRINTING, AND ALLIED INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	
Paper and Pulp Mills	8,585 13.9	14,711 14.0	18,856 12.2	26,904 13.8	25,803 11.0	41,321 15.1	49,709 14.1
Paper-Box Factories	{ 3,857 6.2	{ 8,632 8.2	{ 4,714 3.0	{ 3,796 1.9	{ 4,862 2.1	{ 7,077 2.6	{ 5,767 1.6
Blankbook, Envelope, Tag, etc., Factories					3,422 1.5	5,117 1.9	6,488 1.8
Engravers	{ 4,197 6.8	{ 4,474 4.2	{ 8,017 5.2	{ 10,698 5.5	{ 13,429 5.7	{ 14,492 5.3	{ 18,747 5.3
Printing, Publishing, and Allied Indus- tries	{ 45,295 73.1	{ 77,612 73.6	{ 123,146 79.6	{ 153,812 78.8	{ 186,242 79.7	{ 205,602 75.1	{ 272,058 77.1
Total	61,934 100.0	105,429 100.0	154,733 100.0	195,210 100.0	233,758 100.0	273,609 100.0	352,769 99.9

In 1900 "bookbinders," who had shown a consistent increase, were listed separately for the last time. At that census they numbered 30,278. The group which in the previous decade had been designated "printers, pressmen, and lithographers" was divided into "printers and pressmen" (103,680), and "lithographers" (7,956).

With the exception of the Box Factories group, the number

TABLE 137

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE PAPER, PRINTING, AND ALLIED INDUSTRIES, 1870-1930

Group	1870		1900		1910		
Paper and Pulp Mills	3,884	6,719	8,961	9,424	10,580	13,348	13,920
	37.5	29.3	19.4	16.0	13.9	16.5	18.5
Paper-Box Factories	2,223	7,130	13,043	17,302	13,055	13,375	8,517
	21.4	31.1	28.3	29.4	17.2	16.5	11.3
Blankbook, Envelope, Tag, etc., Factories					6,610	8,577	10,639
					8.7	10.6	14.2
Engravers	{ 29	103	303	453	538	561	690
Printing, Publishing, and Allied Indus- tries	{ .3	.4	.7		.7	.7	
	{ 4,233	8,947	23,771	31,613	45,090	45,274	41,280
	{ 40.8	39.1	51.6	53.8	59.4	55.8	55.0
Total	{ 10,369	22,899	46,078	58,792	75,873	81,135	75,046
	{ 100.0	99.9	100.0	100.0	99.9	100.1	99.9

TABLE 138

WORKERS IN PAPER, PRINTING, AND ALLIED INDUSTRIES: PERCENTAGE OF
TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS
IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.188	.256	.321	.334	.337	.336	.348
All gainful workers, male and female .....	.578	.738	.883	.874	.811	.852	.876
All in Manufacturing and Mechanical Indus- tries	2.087	2.436	2.844	2.805	2.945	2.848	3.141
[Males of]							
All male gainful workers .....	.581	.715	.822	.822	.777	.827	.926
All males in Manufac- turing and Mechan- ical Industries	2.005	2.305	2.587	2.561	2.688	2.599	3.006
[Females of]							
All female gainful workers .....	.565	.865	1.177	1.105	.939	.949	.698
All females in Manu- facturing and Me- chanical Industries ..	2.763	3.303	4.262	4.102	4.173	4.204	3.979

in each subgroup was greater in 1930 than in 1910. Inasmuch as "box makers" did not include laborers for any of these decades, this trend obviously is caused not by difference in census classification but by a more highly mechanized industry.

Relation of Workers in Paper, Printing, and Allied Industries to Population and to the Total of Gainful Workers

Although the Paper, Printing, and Allied Industries group has increased slightly in proportion to both the total population and to the total of gainful workers in each decade from 1900 to 1930, not all divisions within the group have behaved alike. The market demand for paper, paper products, and printed matter has been expanding so rapidly that, despite the technological advances which have increased productivity per worker, a larger working force has been continually required. The changes made within this group since 1890 have been so slight, however, as to have little effect upon the total gainfully employed. It appears that paper, printing, and allied workers just about maintained their proportion of the national labor force for several decades, and the trend would indicate that they are likely to continue to do so for some time to come.

TABLE 139

PERCENTAGE INCREASE OF TOTAL POPULATION, THE TOTAL OF GAINFUL WORKERS, AND ALL WORKERS IN PAPER, PRINTING, AND ALLIED INDUSTRIES, 1870-1930

Year	Total Population	Total Gain- ful Workers	Paper, Printing, and Allied Industries
1870 .....	....	....	....
1880	30.1	39.1	77.5
1890	24.8	30.7	56.5
1900	21.3	27.9	26.5
1910	21.0	31.3	21.9
1920	14.9	9.0	14.6
1930	16.1	17.3	20.6
1930 over 1870 .	218.4	290.5	491.7

Comparing the 1930 group of Paper, Printing, and Allied Workers with that labor force in 1870, we find a gain of 491 per cent. This is 2.2 times the gain made in the total population and 1.6 times the growth in the total of gainful workers. But since 1890 the decade-by-decade development has tended to correspond more closely with the increase of all gainful workers, with no repetitions of the heavy increases recorded prior to that date.

Sex Composition of the Paper, Printing, and Allied Industries Group

Year	Percentage	
	Males	Females
1870	85.7	14.3
1880	82.2	17.8
1890	77.1	22.9
1900	76.9	23.1
1910	75.5	24.5
1920	77.1	22.9
1930	82.5	17.5

Numerically both sexes increased in each decade from 1870 to 1920; but by 1930 the number of women dropped a little below the 1910 figure. The proportion of women to men workers advanced from 1870 to 1910, but in the next two decades receded to a position approximately the same as that in 1880. Wooden-box makers were included in the census of 1870 and 1880, and they were mostly men. The decline in women workers is proved to be due partly to census classification, for when laborers and operatives were reclassified in the 1910 census the body of general factory workers took many males but few females from the Paper, Printing, and Allied Industries group.

Modern mechanization in paper-box factories, which decreased the number of workers needed while increasing productivity beyond the demands of even an enlarging market, is also responsible for the decline in the number of female workers. The fact that former methods of setting type by hand in small shops have given way to larger establishments using typesetting machines accounts for a loss in the number of female printers. Operators of typesetting machines are highly organized, and only reluctantly have women been added to the ranks. Furthermore, the large lithographing establishments have been subjected to such intensive mechanization that their output has been enormously increased without a corresponding increase in the labor required.

The sex composition of the subgroups in 1930 was as follows:

Subgroup	Percentage	
	Males	Females
Blankbook, Envelope, Tag, etc., Factories.....	37.9	62.1
Paper-Box Factories	40.4	59.6
Engravers	96.5	3.5
Paper and Pulp Mills	78.1	21.9
Printing, Publishing, and Allied Industries.....	86.8	13.2

This segregation of workers into the several subgroups indicates that in 1930 women predominated as operatives in blankbook, envelope, tag, etc., factories, and in paper-box factories. Three and a half per cent of all engravers were women. Only 13.2 per cent of the 313,338 persons in printing, publishing, and allied industries were women. This latter group contained 231,538 craftsmen such as printers, lithographers, pressmen, and the like, only 4.5 per cent of whom were women; the remainder of the group, 81,799 persons, were listed as "printing, publishing, and engraving operatives," and "printers' and bookbinders' apprentices," of whom 37.6 per cent were women.

Women workers constituted about the same proportion of blankbook, envelope, tag, etc., factory operatives in the three decades 1910-1930. Their proportion fluctuated somewhat in box factories. They did not vary much after 1890 in their proportion of engravers, and declined somewhat after 1910 in their proportion of operatives in paper and pulp mills. Women also lost ground in printing and lithographing after their maximum number in 1900; and declined in their proportion of publishing workers in the decade ending in 1930.

Operatives in Paper and Pulp Mills

The papermaking industry in this country began in 1690 with the opening of a paper mill near Philadelphia.¹⁰⁶ From then onward a series of inventions, the use of wood fiber, and the introduction of power-driven machinery brought about remarkable advances in the making of paper and pulp. The growth and increasing congestion of population, facilities for rapid communication and transportation, and the extension of our mercantile life—all of which was taking place during the same period of time—provided a ready market for the greatly increased output of paper mills.

The number of operatives in paper and pulp mills in 1930 was 63,629, the largest force of operatives recorded in this industry in the period under review. They made up .13 per cent of the total of gainfully employed in 1930 and the same proportion in 1920, having advanced from .095 per cent in 1910. While the census distinctly designates these workers as "operatives" for the entire six decades, no separate record is made of

¹⁰⁶ *Census of Manufactures, 1909*, X, 750.

the laborers in this industry prior to 1910, unskilled workers having been classified under general laborers in "Domestic and Personal Service." For the decades 1910-1930, laborers have been dealt with in a general body in the "Administrative and Service" category in this text.

According to the occupational statistics of the census, workers in paper and pulp mills were distributed as follows:

Census	Operatives	Laborers	Total
1910	36,383	52,038	88,421
1920	54,669	52,263	106,932
1930	63,629	31,388	95,017

The trend within this industry plainly shows the effect of mechanization. After 1910, the number of machine tenders known as "operatives" continued to increase, but the number of laborers engaged in pulp and paper mills remained stationary in 1920 as compared with 1910 and diminished markedly by 1930.

Table 140 gives certain important information concerning the paper and pulp industry. While this table shows the total

TABLE 140

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE PAPER AND PULP INDUSTRY, 1899-1929*

			1919	1929	Change, 1929 over
Number of establishments	763	777	729	883	120
Percentage change		+ 1.8	- 6.2	+21.1	+ 15.7
Average number of wage earners	49,636	75,978	113,759	128,049	78,413
Percentage change . . . . .	....	+53.0	+ 49.7	+12.6	+157.9
Wages per worker	\$ 418	\$ 536	\$1,192	\$1,352	\$ 934
Percentage change		+28.2	+122.2	+13.3	+223.5
Value added by manufacture per worker	\$1,144	\$1,345	\$2,818	\$3,770	\$2,626
Percentage change		+18.0	+109.3	+33.8	+229.5

* *Census of Manufactures, 1929*, II, 544. Figures per worker computed. In 1937 the number of establishments was 841 and the average number of wage earners, 137,803 (*Census of Manufactures, 1937*, "Paper and Allied Products," p. 1; see also Table 54, above).

number of wage earners employed, the distribution of operatives, laborers, or other workers is not recorded. However, by considering the numbers of operatives and laborers for 1910,

1920, and 1930, indicated just above, it may be seen that as production increased a larger proportion of operatives were enumerated in this industry and a smaller proportion of laborers. It would appear that mechanization, in this instance, while decreasing the labor force required per amount of output, also had the effect of upgrading labor.

The development of the paper and pulp industry since 1899 has not proceeded with regularity. For example, the number of establishments increased slightly in 1909, declined somewhat in 1919, and then increased sharply in 1929. The average number of wage earners employed, however, increased sharply in both 1909 and 1919, but diminished considerably by 1929. Total wages paid, value of products, and value added by manufacture tended to show a like trend during the decades since 1899. The wages paid per worker employed increased 223 per cent from 1899 to 1929, while the value added by manufacture per worker increased 229 per cent.

The actual production of paper of all kinds increased 413 per cent from 1899 to 1929; that of wood pulp increased 312 per cent. By 1929, a labor force (as enumerated in Table 140) 2.58 times that which was used in 1899 produced 4.8 times the amount of paper and pulp.

Along with the growth in physical output of paper and pulp came a concentration of industrial ownership and the reduction in number of independent establishments. Small paper manufacturers were squeezed out, so that by 1917 the Federal Trade Commission reported that 14 American corporations, each with an annual production in excess of 25,000 tons, manufactured more than 82 per cent of all paper produced.¹⁰⁷ The two largest corporations made 42 per cent of the paper produced in the United States. By 1928 a holding company, the International Paper Company, controlled the output and trade policies of companies making 85 per cent of paper on the North American continent.¹⁰⁸

Such business combines inevitably mean a rapid increase in technology, for through combination not only is business efficiency sought but scientific investigation and finance are more readily available than in smaller, independent establishments.

¹⁰⁷ Report of the Federal Trade Commission, *The News Print Paper Industry, 1917*, pp. 33-34.

¹⁰⁸ Harry Laidler, *Concentration of Control in American Industry*, Thomas Y. Crowell Company, New York, 1937, p. 270.

The occupational trends indicate that paper and pulp workers will continue to increase in number for some time to come. Their rate of increase in comparison with the development of the total of gainfully employed is insufficient, however, to do more than maintain their relative position in the national labor force. They have likewise maintained their comparative strength of numbers in the mechanical and manufacturing pursuits in only the last two decades and have decreased slightly in 1930 as compared with their proportion of all paper, printing, and allied trades in 1920.

Paper-Box Factories

In the early days of the United States, paperboard was made by coating sheets of paper (handmade) with an adhesive substance and pressing them together by hand methods. Later, crude machinery was used with straw and waste paper as the materials from which box paper was made. From 1890 onward new methods were devised for cooking and beating the straw. Later, the demand for folded fiberboard boxes, the greater cost of wooden boxes, and the Interstate Commerce Commission's indorsement of fiber shipping containers further advanced the industry.¹⁰⁹ However, the growth of the entire paper industry was slow, until, within the last four decades, the use of improved machinery and wood fiber as box materials revolutionized it.

The number of workers listed by the census as "operatives in paper-box factories" in 1930 was 14,284, a decline of 6,168 from the 1920 number and 3,633 less than for 1910. This decline occurred in the face of an increased output in value of paper boxes from \$54,450,015 in 1909 to \$294,253,296 in 1929.¹¹⁰

Most paper-box operatives are females, and it is this group which suffered the greatest loss in the displacement of workers. The large proportion of males in 1870 and 1880 is probably due to two things: makers of wooden boxes were included in the census in these years; and large numbers of women had not yet entered these industries.

Operatives in paper-box factories were the same proportion

¹⁰⁹ United States Department of Labor, Bureau of Labor Statistics, *Bulletin No. 407*, October 1926, pp. 50-51.

¹¹⁰ The number of establishments in 1929 was 1,249 and in 1937 was 1,257. The average number of wage earners in 1929 was 55,654 and in 1937 was 65,158. In 1937 the value of shipping containers made up more than half the value of products of the industry. (*Census of Manufactures, 1937*, "Paper and Allied Products," pp. 19, 29.)

of the total population in 1920 as in 1910 and suffered a small decrease in 1930 as compared with 1920. The proportions such workers were of the Paper and Printing group, the Manufacturing and Mechanical category, and the total of gainfully employed in 1920 remained substantially the same as in 1910 but declined rather markedly from 1920 to 1930.

Because of technological conditions in this industry, there is little probability of change which will greatly increase the number of workers. This group of workers is too small, however, for either an upward or a downward trend to influence seriously the development of the nation's labor force.

Blankbook, Envelope, Tag, etc., Factories

As the economic civilization advanced in the United States, both the business and the educational life of the nation required more record keeping. The result has been an increasing standardization of blankbooks, envelopes, and many similar supplies. Large printing plants specialize in these products.

The census has listed operatives in these plants since 1910. The number of such workmen increased in each successive decade on record, until in 1930 it totaled 17,127, which was .03 per cent of all gainful workers. The laborers listed in this industry numbered 1,557 in 1910, 3,455 in 1920, and 3,926 in 1930. Workers classified as operatives in this industry are mostly semiskilled, with some skilled artisans among them. Although mechanization has advanced to the place where new presses and cutting, folding, and counting machines have greatly increased output¹¹¹ per worker, the actual number of operatives has also increased. This does not mean that the same amount or kind of skill required of the old-type workman is demanded of the modern factory operative. A noticeable change has occurred in recent years: operatives in factories making such supplies as blankbooks, envelopes, and tags are tending semiautomatic machines rather than operating hand-worked machines requiring individual skill.

It is probable that the trend noted in the tables will continue for some time to come, as the market for the supplies manufactured by these industries continues to expand faster than technological changes displace workers. However, the number of such operatives is too small and their increase in

¹¹¹ Elizabeth F. Baker, *Displacement of Men by Machines*, Columbia University Press, New York, 1933.

numbers much too slight to have any appreciable effect upon the development of the total of gainful workers.¹¹²

Engravers

Engravers are skilled workmen whose services are required in many industries. They are listed separately by the occupational census for the six decades being studied. The total number of engravers in 1930 was 19,437. Of this number, according to the industrial census, 12,920 were in "paper, printing, and allied industries"—12,720 in the "printing, publishing, and engraving" branch; 156 in "blankbook, envelope, tag, paper-bag, etc., factories"; and 44 in "paper and pulp mills." The other 6,517 engravers were distributed as follows: "metal industries (except iron and steel)," 2,644 (of whom 1,863 were in "jewelry factories" and the remainder were scattered in small numbers throughout the other metal industries); "miscellaneous manufacturing industries," 1,026; "trade," 814; "iron and steel and vehicle industries," 742; "textile industries," 502; and smaller numbers in "clay, glass, and stone," "domestic and personal," "lumber and furniture factories," and so forth.

In 1910, the only other decade in which an industrial classification is available, the 15,053 engravers were distributed throughout industry in very much the same proportion as in 1930.

Numerically these craftsmen have increased decennially since 1870. In relation to population, all gainful workers, Manufacturing and Mechanical Industries, and the total of Paper, Printing, and Allied Industries, engravers have maintained fairly constant proportions since 1880. At the 1930 census they recorded an increase sufficient to indicate a future upward trend for this group. The group is so small (in 1930 only .4 per cent of the total gainful workers) that any increase which may occur will probably have little influence upon the development of the national labor force.

Printing, Publishing, and Allied Industries

The census classification and enumeration of occupations within the Paper, Printing, and Allied Industries group has been rather loose. As printing industries grew and machines were invented, new processes were developed and many new

¹¹² For recent trends in the manufacturing of envelopes and tags see *Census of Manufactures, 1935, 1937, "Paper and Allied Products."*

types of workers were required whose form of work and occupational designations changed from decade to decade. In reclassifying all members of the printing trade, numerous shifts took place in the census, especially in the first four decades.

The art of printing has been revolutionized since the development of the cylinder and rotary presses. The first newspaper with continuous publication was started in this country in 1704, and for a hundred years thereafter printing was accomplished in the same manner by the use of handset type on hand presses. Cylinder presses came into use shortly after the beginning of the nineteenth century; but as late as 1840 their capacity was limited to a maximum of 1,500 sheets printed on a single side per hour.

In 1875 the principles of the modern rotary press were perfected, and these presses were installed in newspaper and large printing offices. Their average production was 12,000 papers and hour. The limit of capacity depended primarily on the ability of the paper to withstand the tension to which it was subjected. Further improvements were made, and by 1900 rotary presses which had a capacity of 216,000 eight-page papers an hour were in operation and running automatically except for occasional adjustments.¹¹³ New inventions and improvements made since then include color printing, offset, and lithoprinting. Stereotype and platemaking have been greatly improved, and engraving has been altered as well. All such changes have tended to displace old-fashioned hand processes and the skilled printers of other days are found now primarily in the specialty shops.

The effects of mechanization are revealed by the fact that while value added by manufacture in book and job printing rose more than 760 per cent from 1899 to 1929, only 120 per cent more workers were employed.¹¹⁴ In newspaper and periodical printing the results are even more striking. The value added by manufacture increased 679 per cent, while the number of workers increased only 34 per cent. The productivity of labor per man-hour in newspaper printing increased 264 per cent from 1896 to 1926.¹¹⁵

Prior to 1910 the census classified workers in printing and allied industries under different designations. The following

¹¹³ *Encyclopaedia Americana*, Publishers Association, 1937, XX, 287.

¹¹⁴ *Census of Manufactures, 1929*, II, 575-78.

¹¹⁵ See Table 54, above, for changes from 1929 to 1936.

display gives the census captions and the number of workers in each classification:

TABLE 141
CENSUS SUBGROUPS IN PRINTING AND ALLIED INDUSTRIES, 1870-1930

Subgroup	1870	1880	1890	1900	1910	1920	1930
Bookbinders	9,104	13,833	23,858	30,278	....	....	....
Printers, Lithographers, and Sterotypers..	40,424	72,726	....	....	....	....	....
Printers, Lithographers, and Pressmen...	....	....	86,893	....	....	....	....
Printers and Pressmen .....	....	....	....	103,680	....	....	....
Printers' Apprentices .....	....	....	4,635	3,501	....	....	....
Compositors .....	....	....	30,060	36,838	....	....	....
Compositors, Linotypers, and Typesetters	....	....	....	....	127,589	140,165	183,632
Pressmen and Plate Printers (printing)..	....	....	....	....	20,084	18,683	31,215
Lithographers .....	....	....	....	7,956	8,138	8,222	8,868
Electrotypers and Sterotypers .....	....	....	1,471	3,172	4,368	5,494	7,824
Printing, Publishing, and Engraving Op- eratives .....	....	....	....	....	58,758	66,700	70,871
Printers' and Bookbinders' Apprentices*...	....	....	....	....	12,395 ^b	11,603	10,928
Total	49,528	86,559	146,917	185,425	231,332	250,876	313,388

* No Bookbinders' Apprentices listed before 1910. Probably classified with Bookbinders.

^b Approximate only.

The *Census of Manufactures*, in recording the number of wage earners, value of products, and the like, for the various censuses, groups blankbook-making and bookbinding establishments together. The number of books and pamphlets printed is not available for the earliest years, but the number was 161,361,844 in 1900,¹¹⁶ 252,068,816 in 1919,¹¹⁷ and 430,199,433 in 1929.¹¹⁸

The invention of machines causing new forms of labor and the adoption of new occupational titles for workmen in book-binding industries probably account for these persons being reclassified under new captions. The number of handcraftsmen in this trade decreased rapidly in the years from 1900 to 1910. According to the *Encyclopaedia of the Social Sciences* modern printing machinery led to the departmentalizing of the printing industry which, in turn, resulted in the specializing of craft unions in the United States. The bindery has been

¹¹⁶ *Census of Manufactures, 1914*, p. 162.

¹¹⁷ *Census of Manufactures, 1921*, p. 626.

¹¹⁸ *Census of Manufactures, 1931*, p. 530. From 1929 to 1935 an overall decline in the production of books occurred, amounting to 34 per cent, whereas an increase in magazine circulation of 4 per cent is reported. The number of periodicals produced for the same period declined by 12 per cent. (Douglas Waples, *People and Print*, University of Chicago Press, pp. 60, 61.)

mechanized by the installation of automatic processes for folding, gathering, and covering books and magazines.¹¹⁹ The few bookbinders that were still working as skilled craftsmen after 1910 were probably classified with other workers under different captions.

In 53 commercial printing plants studied in New York City, it was found that, while there was a 7.9 per cent increase in employment of skilled pressmen in 1929 as compared with 1924, there was 5.7 per cent net displacement of unskilled or semiskilled press assistants. In New York, where between 1913 and 1929 hand feeding was reduced from 75 per cent to 15 per cent of all press feeding, the membership of the press-feeders' or assistants' local unions remained practically stationary, and memberships of the highly skilled pressmen actually rose 33 per cent.¹²⁰

The decrease in the number of pressmen and plate printers from 1910 to 1920 may reasonably be accounted for by the fact that new and improved presses were installed which considerably lessened the need for workers. The upswing in numbers in the 1930 census is quite likely due to several factors: Cheaper materials were available. The development of commercial advertising brought down the cost of newspapers at the very time when general education and public enlightenment were growing rapidly.¹²¹ Changes in business¹²² made commercial life dependent upon information disseminated by the daily press. The desire for immediate knowledge of events created such an increased output of printed matter that, despite the greater productivity per worker employed, a much larger force of pressmen and plate printers was required.¹²³

Printing, Publishing, and Engraving Operatives and Printers' and Bookbinders' Apprentices are the only divisions of the group that have shown decreases in the decades preceding 1930. Numerically, all other divisions increased. However, in relation to the whole Paper, Printing, and Allied Industries group the Printing, Publishing, and Allied Industries subgroup

¹¹⁹ *Encyclopaedia of the Social Sciences*, The Macmillan Company, 1933, XII, 412-13.

¹²⁰ *Ibid.*

¹²¹ *Encyclopaedia Americana*, 1937, XX, 87 ff.

¹²² *Productivity of Labor in Newspaper Printing*, United States Department of Labor, Bureau of Labor Statistics, *Bulletin No. 475*, 1929, p. 250.

¹²³ Edmond E. Day and Woodliff Thomas, *Growth of Manufacture, 1899 to 1923*, United States Department of Commerce, Bureau of the Census, *Census Monographs VIII*, p. 71.

experienced a drop in the period from 1910 to 1920 and an increase from 1920 to 1930. The increase registered in the 1920-1930 decade was sufficient to bring the entire subgroup back to the 1910 percentage of the total population, the total of gainful workers, and the total in the Manufacturing and Mechanical category. (See Table 137.)

The numbers listed as laborers in this subgroup are insignificant—5,484 in 1910, 7,981 in 1920, and 10,822 in 1930. Craftsmen, operatives, and apprentices comprise by far the larger part of the body of workmen who have produced our reading matter throughout the years.

Printing and publishing establishments have grown in number with the increasing demand for newspapers, books, and magazines.¹²⁴ These businesses do not require the great amount of fixed capital or costly equipment so characteristic of other manufactures, such as automobiles and steel, in which concentration of establishments and large-scale production have become paramount. Yet modern methods of printing, communication, and transportation have made it possible for practical consolidations in the magazine and newspaper fields into a relatively few large chains which dominate the printing and publishing industry. The field of book publication is controlled by relatively few national concerns which have well-established trade outlets for their product. There are many independent newspapers and publishing houses, however, so that the few gigantic establishments do not control the nation's output of printed matter.

In the field of newspaper publication, technical changes have been made and others are pending which may radically alter the work of printers and publishers. Smaller papers now depend a very great deal upon so-called "boiler-plate" shipped in from newspaper syndicates or from press associations. Their setting and printing of original material has consequently been greatly reduced. It is possible that when the telephoto process becomes practical the amount of local composition of newspapers will be further reduced.

So far as the employment of printers and publishers is concerned, the offsetting factors which may prevent a serious

¹²⁴ The *Census of Manufactures, 1937*, reports an increase in the number of establishments for Printing, Publishing, and Allied Industries from 16,857 in 1933 to 19,831 in 1937. The corresponding figures for average number of wage earners were 213,786 and 276,583.

reduction in their ranks will be an increase in local material, and a generally increased number of newspapers. But the former becomes more remote as the congestion of population and the settlement of the country widens the sphere of people's interests, and the facts on newspaper consolidations lead to the general conclusion that fewer individual papers will be required in the future. For example, twice the number of cities were supplied with only one daily paper in 1928 as compared with the number which had two papers.¹²⁵

It is probable that the number of printers and lithographers will continue to increase, barring such revolutionary changes as are contemplated by inventions now being experimented with in photolithing, lithoprinting, photoprinting, and type-writing printing. There is a prospect that the industry is on the verge of adopting one or another of these substitutes for present methods of printing and lithographing. Should this occur, the present number of printers and lithographers will be seriously affected and may be reduced. If such changes are introduced gradually, as is often the case in industry, the effect on the number of printers and lithographers will not be so serious. But the prospect of substitutes is so imminent that it must be carefully considered in any analysis of the labor force used in printing and lithographing.

K. FOOD INDUSTRIES

General Characteristics (Tables 142 to 146, Chart 10)

The factory preparation of food is distinctly a development of our modern industrial era. It had become a major industry in 1930, with a labor force of 385,286 skilled and semiskilled operatives.^{125a} This force was .31 per cent of the total population, .78 per cent of the total of the gainfully employed, and

¹²⁵ See "The Dying Daily," *Nation*, August 22, 1928, p. 170. The number of newspapers published in the United States decreased by 221 in 1937. The 1937 total includes 2,084 English-language dailies, down 23; 10,029 weeklies, down 176; and 359 semi-weeklies, down 18. There were 15 more dailies with Sunday editions, an increase of 11 in the number of foreign-language dailies, and three more triweekly papers. "Decrease in Newspapers," *Nation's Business*, May 1938, p. 80.

^{125a} "Operatives" is used in this chapter to include skilled workers such as bakers and millers and also semiskilled workers directly associated with the food industry. It does not include common labor.

TABLE 142.

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE
AND FEMALE, IN FOOD INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	
Bakeries	27,680	41,309	60,197	79,188	98,469	118,381	168,701
Butter, Cheese, and Condensed-Milk Factories	27.3	28.6	31.7	33.6	38.8	35.7	43.8
	3,534	4,570	11,211	19,241	11,598	18,841	25,707
	3.5	3.2	5.9	8.2	4.6	5.7	6.7
Candy Factories	8,219	13,692	23,251	31,194	30,943	52,281	44,470
	8.1	9.5	12.2	13.3	12.2	15.8	11.5
Fish Curing and Packing, Fruit and Vegetable Canning, Slaughtering and Meat Packing	2,377	6,296	7,109	23,977	33,963	67,781	78,603
	2.3	4.4	3.7	10.2	13.4	20.5	20.4
Millers	41,582	53,440	52,841	40,548	27,144	31,384	22,818
	41.0	36.9	27.8	17.2	10.7	9.5	5.9
Liquors and Bever- ages	14,578	21,604	30,906	34,625	31,503	15,655	11,187
	14.4	14.9	16.3	14.7	12.4	4.7	2.9
Salt Works*	1,721	1,431	1,765	1,775	4,365	5,472	4,124
	1.7	1.0	.9	.8	1.7	1.7	1.1
Sugar Refineries	1,609	2,327	2,616	2,727	1,871	3,806	3,778
	1.6	1.6	1.4	1.2	.7	1.1	1.0
Other Food Factories				2,078	13,978	17,633	25,898
				.9	5.5	5.3	6.7
Total	{ 101,300	144,669	189,896	235,353	253,834	331,234	385,286
	{ 99.9	100.1	99.9	100.1	100.0	100.0	100.0

* Salt works operatives added from Extraction of Minerals in 1910, 1920, and in 1930; "saltmakers" added from Chemical and Allied Industries; "salt works employees" added from Chemical and Allied Industries.

2.8 per cent of the Manufacturing and Mechanical category.
Its composition in 1930 was as follows:

Group	Percentage
Bakeries	43.8
Butter, Cheese, and Condensed-Milk Factories	6.7
Candy Factories	11.5
Fish Curing and Packing, Fruit and Vegetable Canning, Slaughtering and Meat Packing	20.4
Millers	5.9
Liquors and Beverages	2.9
Salt Works	1.1
Sugar Refineries	1.0
Other Food Factories	6.7
Total	100.0

In Tables 142 to 145 may be traced the result of the historic changes which have shifted the production of foods from

TABLE 143

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE FOOD INDUSTRIES, 1870-1930

Group	1870		1900		1910	1920	
Bakeries	{ 27,442	40,246	{ 57,910	74,860	87,760	102,205	144,486
Butter, Cheese, and Condensed-Milk Factories	{ 27.8	28.7	{ 32.3	34.9	41.7	40.4	50.3
	{ 2,750	4,230	{ 10,808	18,593	11,065	16,096	21,331
	{ 2.8	3.0	{ 6.0	8.7	5.3	6.4	7.4
Candy Factories	{ 7,607	11,892	{ 17,577	21,980	13,608	20,913	17,404
	{ 7.7	8.5	{ 9.8	10.2	6.5	8.3	6.1
Fish Curing and Packing, Fruit and Vegetable Canning, Slaughtering and Meat Packing	{ 1,839	5,132	{ 5,503	19,606	27,405	50,167	51,947
	{ 1.9	3.7	{ 3.1	9.1	13.0	19.8	18.1
Millers	{ 41,343	53,363	{ 52,747	40,362	26,843	30,789	22,226
	{ 41.8	38.1	{ 29.5	18.8	12.8	12.2	7.7
Liquors and Beverages	{ 14,559	21,466	{ 30,280	33,526	29,664	14,960	10,413
	{ 14.7	15.3	{ 16.9	15.6	14.1	5.9	3.6
Salt Works	{ 1,721	1,390	{ 1,66	1,671	4,032	4,994	3,717
	{ 1.7	1.0	{ .9	.8	1.9	2.0	1.3
Sugar Refineries	{ 1,599	2,313	{ 2,612	2,708	1,655	3,144	3,070
	{ 1.6	1.7	{ 1.5	1.3	.8	1.2	1.1
Other Food Factories				1,326	8,192	9,791	12,743
				.6	3.9	3.9	4.4
Total	{ 98,860	140,032	{ 179,099	214,632	210,224	253,059	287,337
	{ 100.0	100.0	{ 100.0	100.0	100.0	100.1	100.0

the home to the factory. In 1870 most baked goods were made by the housewife in the home, and bakery workers numbered less than 30,000. In 1930, the number of bakers and bakery operatives was 168,000. In 1870 this group was only .07 per cent of the population, and by 1930 it had become .13 per cent, indicating the extent to which our present population has become dependent upon factory-baked goods.

In 1870 the food industries had a labor force of 101,300 persons. Gains were made in the number of workers in each successive decade thereafter. Such conditions as the cityward movement of the population,¹²⁶ the increasing employment of women in remunerative labor, the extension of intensive, single-crop farming, mass production of foodstuffs at lowered cost, factory-making and -processing of a greatly increased variety of foods, new methods of refrigeration and marketing,

¹²⁶ See chapter II, above, where figures on the extent and character of this movement are given.

TABLE 144

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE FOOD INDUSTRIES, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Bakeries	{ 238	1,063	2,287	4,328	10,709	16,176	24,215
Butter, Cheese, and Condensed-Milk Factories	{ 9.7	22.9	21.2	20.9	24.6	20.7	24.7
Candy Factories	{ 784	340	403	648	533	2,745	4,376
Fish Curing and Packing, Fruit and Vegetable Canning, Slaughtering and Meat Packing	{ 32.1	7.3	3.7	3.1	1.2	3.5	4.5
Liquors and Bever- ages	{ 612	1,800	5,674	9,214	17,335	31,368	27,066
Other Food Factories	{ 25.1	38.8	52.6	44.5	39.8	40.1	27.6
Millers	{ 538	1,164	1,606	4,371	6,558	17,614	26,656
Liquors and Bever- ages	{ 22.0	25.1	14.9	21.1	15.0	22.5	27.2
Salt Works	{ 239	77	94	186	301	595	592
Sugar Refineries	{ 9.8	1.7	.9	.9	.7	.8	.6
Other Food Factories	{ 19	138	626	1,099	1,839	695	774
Other Food Factories	{ .8	3.0	5.8	5.3	4.2	.9	.8
Other Food Factories	{	41	103	104	333	478	407
Other Food Factories	{ ....	.9	1.0	.5	.8	.6	.4
Other Food Factories	{ 10	14	4	19	216	662	708
Other Food Factories	{ .4	.3	....*	.1	.5	.8	.7
Other Food Factories	{ ....	....	....	752	5,786	7,842	13,155
Other Food Factories	{ ....	....	....	3.6	13.3	10.0	13.4
Total	{ 2,440	4,637	10,797	20,721	43,610	78,175	97,949
	{ 99.9	100.0	100.1	100.0	100.1	99.9	99.9

* Less than .1 per cent.

and the development of rapid communication and transportation all have combined to make people in all walks of life much more dependent upon fabricated or factory-processed foods.

The production of factory-made foods increased with accelerated rapidity during the successive decades of this century. Yet from 1870 to 1900, while the number of workers in the food industries increased 134,053, from 1900 to 1930, when the output was relatively much greater, the number of semi-skilled machine operatives added to the food factories of the nation was only 149,933.

With the exception of Millers and Liquors and Beverages all subgroups in Food Industries experienced an increase in the number of workers from 1870 to 1930. The situation with regard to liquors and beverages can be explained by the fact that the census of 1930 was taken during the Prohibition era. The reduction in number of millers in the face of a greatly in-

TABLE 145

WORKERS IN THE FOOD INDUSTRIES: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population.....	.263	.288	.303	.310	.276	.313	.314
All gainful workers, male and female.....	.810	.832	.835	.809	.665	.796	.789
All in Manufacturing and Mechanical Industries	2.924	2.747	2.689	2.599	2.414	2.659	2.829
[Males of]							
All male gainful workers .....	.927	.950	.952	.904	.699	.765	.755
All males in Manufacturing and Mechanical Industries	3.200	3.100	3.000	2.800	2.400	2.400	2.400
[Females of]							
All female gainful workers .....	.110	.190	.280	.390	.530	.910	.910
All females in Manufacturing and Mechanical Industries..	.700	.700	1.000	1.400	2.400	4.100	5.200

creased output of flour (96 per cent from 1880 to 1930) is due largely to the mechanization which has taken place in milling and the concentration of the industry in relatively few large mills. There were 6.3 per cent fewer mills in 1930 than in 1869.

In comparison with the development of the total body of gainful workers the group of operatives in food industries increased rapidly from 1870 to 1890, dropped slightly in 1900, then sharply in 1910, increased in 1920, and again dropped in 1930. This erratic course of development reflects, in part at least, the cyclical character of economic life and the rise and fall of purchasing power. With the exception of 1910 the labor force of operatives in food industries in 1930 was proportionately smaller than in any other census on record. Thus while food factory operatives are still an important part of the gainfully employed, they constitute a less significant part of that body than formerly, indicating a diversion of labor to other channels.

How the Food Industries group has developed in comparison with the total population and the total of gainful workers is shown in Table 146.

TABLE 146

PERCENTAGE GAIN OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL OPERATIVES IN FOOD INDUSTRIES, 1870-1930

Census	Total Population	Total Gain- ful Workers	Food Industries
1870 .....	....	....	....
1880	30.1	39.1	42.8
1890	24.8	30.7	31.3
1900	21.4	27.9	23.9
1910	21.0	31.3	7.9
1920	14.9	9.0	30.5
1930	16.1	17.3	16.3
1930 over 1870 .	218.4	290.5	280.3

The number of operatives in food factories increased more rapidly from 1870 to 1930 than did the total population—a fact which confirms the observation that the population has become more dependent upon factory-made foods. But this labor force has not kept pace, during the period under review, with the increase of all gainful workers.

Sex Composition of the Group of Operatives in Food Industries

The following display exhibits the trend toward the employment of women operatives in food industries which are undergoing mechanization:

Census	Percentage	
	Males	Females
1870	97.6	2.4
1880	96.8	3.2
1890	94.3	5.7
1900	91.2	8.8
1910	82.8	17.2
1920	76.4	23.6
1930	74.6	25.4

From only 2.4 per cent of the number of all food-factory operatives in 1870, females advanced to 25 per cent in 1930. Although the number of both males and females engaged in these factories increased during the sixty years, the group of male operatives grew 190 per cent, while females made the phenomenal advance of 3,914 per cent. In 1930 female operatives dominated the candy and miscellaneous food factories, made up over half of all fish-curing and packing operatives, and were of consequence in bakery plants, but were of negligible importance in milling, in liquors and beverages, and in salt factories.

Barring some public policy to the contrary, there is every reason to presume that increased mechanization of food factories will see proportionately more females than males added to the labor force. However, there is little in the trends to indicate that the point has been reached where females will displace males, for both are increasing in numbers. That such displacement does occur in particular industries is proved over and over again by specific instances in food factories; but the over-all figures do not yet show the displacement of males by females.

Bakeries

Commercial baking in the United States is a large and growing industry. It ranked only eighteenth among the country's industries in 1909, but in 1935 it was sixth and was fifth in average number of wage earners. In 1923 the national baking industry witnessed the patenting of an oven capable of producing 5,000 loaves an hour—thirty times the output of the standard oven up to 1923.¹²⁷ Modern bakeries are quite different from the hand-kneading, wood- and coal-stoked oven bakeries of thirty or more years ago. Today standardized mixers, cutters, and weighers, and thermostat-controlled electric and gas ovens have developed uniformity of product and have considerably changed the skill demanded of bakers, thereby greatly increasing the output per worker employed. The meringue pie-decorating machine, for example, has been substituted for hand operations and a single girl tending the machine can turn out an average of 300 pies an hour.

But even with all these improvements and the large increase in bakery products, in the sixty years from 1870 to 1930 the number of bakers and semiskilled operatives in bakeries increased only 141,021 (from 27,680 to 168,701). However, common laborers, classified elsewhere in this study, made some small contribution to this production. The census did not classify these laborers separately until 1910; in that year they numbered 4,510 and by 1930 had increased to 12,362. During the thirty years from 1870 to 1900 the operative group, including bakers, increased 51,508; during the thirty years from 1900 to 1930 it increased 89,513. This increase was substantially

¹²⁷ H. Kyrk and J. S. Davis, *The American Baking Industry, 1849-1923, as Shown in the Census Reports*, Food Research Institute, Stanford University, pp. 1, 3-16. See also R. S. Lynd and H. M. Lynd, *Middletown*, Harcourt, Brace and Company, New York, 1929, p. 158.

greater proportionately than the increase in population, the gain in number of these bakery workers being 509 per cent in the sixty years as compared with a 218 per cent gain in total population.

The percentage increase in the bakeries group from 1870 to 1930 has been almost twice as great as that in all gainfully employed workers—509 per cent compared with 290 per cent. In all decades except that of 1910, when a slight decline was noted, these bakery workers increased from .22 per cent of the total labor force in 1870 to .34 per cent in 1930.

From less than one per cent of all workers listed as bakers and semiskilled operatives in 1870, the number of females increased to 14 per cent of such workers in 1930. This is evidence not only of the mechanization of the baking industry but also of the shift in the character of that industry to include factory-making of crackers, cookies, and cakes, in which operations women and girls are extensively employed. However, labor in the baking industry, especially in the bread- and pastry-making establishments, is still largely masculine. The reason for this is historical rather than because the nature of the work done today requires men instead of women workers. The predominance of masculine labor rests in the fact that hours of labor and working conditions in baking establishments have not been attractive to women.

Certain comparative statistics of value concerning the development of the baking industry are given in Table 147.

The wages paid per worker employed increased 150 per cent from 1889 to 1929, whereas the value added by manufacture increased 271 per cent.

Fortune declared in its July 1938 number that no more than 25 per cent of the bread eaten in the United States is baked in the home, principally by farmers' wives living far from town. This is not because they cannot afford to buy factory-made bread but because the big bakers cannot afford to deliver it to remote places at town prices. *Fortune* also reports the producers of the remaining 75 per cent as follows:

	Percentage
Big restaurants, hotels, and public institutions	10
Chain groceries, who by and large bake their own bread ...	8
Big baking companies	50
Small local bakeshops	7

TABLE 147

NUMBER OF BAKING ESTABLISHMENTS, NUMBER OF WORKERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE BAKING INDUSTRY 1889-1929*

		1889	1909	1919	1929	Change,
Number of establishments	10,484	14,836	23,926	25,095	20,785	10,301
Percentage change .....	....	+41.5	+61.3	+ 4.9	-17.2	+ 98.2
Average number wage earners	52,762	60,192	100,216	141,592	200,841	148,079
Percentage change .....	....	+14.1	+66.5	+41.3	+41.8	+280.6
Wages per worker	\$ 546	\$ 463	\$ 592	\$1,117	\$1,367	\$ 821
Percentage change .....	....	-15.2	+27.8	+88.7	+22.4	+150.4
Value added by manufac- ture per worker	\$1,060	\$1,334	\$1,586	\$3,098	\$3,930	\$2,870
Percentage change		+25.8	+18.9	+95.2	+26.8	+270.9

* *Eleventh Census of United States, 1890, "Manufacturing Industries," Part I, p. 74; Census of Manufactures, 1929, II, 52. Per-worker figures computed. See also American Baking Industry, 1849-1923, as Shown in Census Reports, by Hazel Kyrk and J. S. Davis, Stanford University, 1925. Also Table 54, above. By 1937 the number of establishments had declined to 17,193 and the average number of wage earners had increased to 239,388 (Census of Manufactures, 1937, "Bakeries," p. 2).*

One of the "big four" bakeries is declared to have sold 45 per cent of all bread eaten in the country in 1937. Since the extent of the market for factory-made bread is determined by the feasibility of its transportation, it is to be supposed that further improvement of transportation facilities will advance the percentage of factory-made bread in the country toward the 100 per cent maximum.¹²⁸

Operatives in Butter, Cheese, and Condensed-Milk Factories

The factory making of butter is a result of the modern trend toward urbanization, sanitary regulation of manufactures, and the business development of trade names and large-scale merchandising methods. Times have changed so that even many farmers no longer churn their own butter but buy it in the city. Cheese making has become almost entirely a factory enterprise.

The increase in per capita consumption of butter, cheese, and condensed milk in pounds, for years following the World War, has been estimated¹²⁹ as follows:

¹²⁸ The NYA of Kentucky (R. K. Salyers, State Director) has a publication with the title, *Occupations in the Baking Industry*, Louisville, Kentucky, October 1937.

¹²⁹ United States Department of Commerce, Bureau of Foreign and Domestic Commerce, *Bulletin No. 38, Domestic Commerce Series*, 1930. For the period 1929-34 a net percentage increase of 3.5 is reported in the production of butter, a decline of 2.9 per cent in canned milk, and a decline of 4.2 in cheese (C. A. Bliss, *op. cit.*). Establishments numbered 6,820 in 1929 and 6,884 in 1937; and average number of wage earners 29,503 in 1929 and 32,886 in 1937. (*Biennial Census of Manufactures, 1935*, p. 64, and 1937, "Milk Products," p. 2).

Year	Butter	Cheese	Condensed Milk
1918	14.0	3.0	12.5
1920	14.7	3.5	10.2
1922	16.5	3.7	12.7
1924	17.4	4.2	14.0
1926	17.8	4.4	14.3
1928	17.6	4.1	15.1

Operatives in butter and cheese factories increased from 3,534 in 1870 to 25,707 in 1930. In only one census, that of 1910, was there a decline from the previous census in the number of such workers. In comparison with the development of the total of the gainfully employed this group of workers remained about stationary in 1870 and 1880, increased both in 1890 and in 1900, fell sharply in 1910, and increased in the two decades thereafter.

During the years since the turn of the century butter- and cheese-making machinery has been perfected. However, units of manufacture still depend largely upon being located adjacent to dairy herds. This condition makes for many small factories, retards the development of large-scale labor-saving machinery, and as more factory units are developed tends to employ a larger labor force. It is probable that the present trend of increase will continue for some time; but here again the number of butter and cheese workers is too small for this situation to materially affect the character of the total labor force.

Candy Factories

The Candy Factories group totaled 44,470 in 1930 and constituted .09 per cent of the gainfully employed. It increased over fivefold between 1870 and 1930—an indication of the increasing use of confections, for the population had increased only twofold in the same period of time. In the handicraft stage of the commercial candy business male workers dominated the trade; but after 1900, when the factory system was expanded and many kinds of retailers other than candymakers dispensed candies, the number of female workers increased to make them the dominant sex employed in candy manufacture.

The number of female candymakers increased in each decade from 1870 to 1920 and declined somewhat in 1930, but was even then appreciably greater numerically than at any other time except 1920. The number of male candy workers, on the

contrary, increased from 1870 to 1900, which was their maximum year, declined sharply in 1910, expanded greatly in 1920, and declined again in 1930. Their number in that year was less than in any census since 1880 except that of 1910. In 1930 females constituted 61 per cent of the Candy Factories group. This trend of displacement is likely to continue, for much of the work in candy factories is of such a character, both in the handicrafts and the machine-tending operations, that women are even more efficient and usually can be hired at lower wages than men.

An average percentage gain in the number of candy workers of 14 per cent is recorded for the period 1900 to 1930, but a more than 10 per cent loss is noted from 1920 to 1930. This loss may foreshadow a slackening need for labor in this industry as a result of mechanized processes.

From sources other than the Census of Occupations the figures of Table 148 have been derived, having to do with aspects of the candy industry. "Number of employees" refers to all employed workers.

TABLE 148

THE CANDY INDUSTRY: NUMBER OF EMPLOYEES, POUNDS PRODUCED PER EMPLOYEE, POUNDS CONSUMED PER CAPITA, AND VALUE PER CAPITA, 1929-1936

Year	Number of Employees ^a	Pounds Produced per Employee	Pounds Consumed per Capita ^b	Value per Capita ^b
1929	63,501	29,955	15.7	\$3.40
1930 .....	.....	.....	14.5	2.99
1931	51,262	31,622	13.1	2.41
1933	50,609	32,113	13.0	1.80
1935	52,109	36,281	14.9	2.21
1936 .....	.....	.....	16.0	2.41

^a Census of Manufactures, 1935, p. 110.

^b Reported in "Candy Making," *Occupations: A Series of Vocational Studies*, NYA of Illinois (W. J. Campbell, State Director). See especially Table 54, above, "Confectionery."

It appears that since 1929 there has been a decrease in the actual number of employed candy workers, that the per-worker productivity has increased notably, and that the per capita consumption has likewise increased somewhat. If increased mechanization is a permanent trend, it is obvious that more workers will be required only from a lowered price or from increased purchasing power, or both. There has been a drastic drop in average price from 23.2 cents per pound in 1927 to

15.1 cents in 1935. If the price drop is to continue, as seems likely, it may counteract somewhat the effect of increasing per-worker productivity. The better opportunities are in the skilled hand operations.

Fish Curing and Packing, Fruit and Vegetable Canning, Slaughtering and Meat Packing

The number of workers engaged as operatives in the industries here indicated has grown from 2,377 in 1870 to 78,603 in 1930. In each successive decade this labor force has expanded. The rate of growth has been more rapid than either the total population increase or the gain in the national labor force, indicating that these industries have assumed a place of larger importance than they had formerly. In comparison with the development of the total of gainful workers, the group increased more rapidly from 1870 to 1880, maintained its position in 1890, increased in 1900 and in 1910, but declined in 1920, and held the same position in 1930. The decade-by-decade development has not been startling at any time, gains or losses in proportion to the total labor force being a fraction of one per cent at any census.

This somewhat unsteady development was caused primarily by the reduction in numbers of male workers. From 1870 to 1900 the number of females in this group increased, and expanded rapidly in successive decades until, in 1930, women had become a third of all such workers. The gain in women operatives in these industries in the last ten years was 9,042; whereas males gained only 1,780. There is every prospect that this trend toward dominance of female operatives in these industries will continue as they become mechanized increasingly. Much of the labor is still hand work and the conditions under which work is done are not attractive to women, yet their number is constantly increasing and they are displacing men.

Figures for the subdivisions of this group from 1910 to 1930 are shown in Table 149.

The meat-packing industry is shown to have distinctly the major group of workers of the three divisions throughout the thirty-year period, amounting to from two-thirds to three-quarters of all. Fruit and vegetable canning is next in order of importance, fish curing and packing third. In 1930 fruit and

TABLE 149

NUMBER AND PERCENTAGE OF OPERATIVES, WITH PERCENTAGE INCREASES, IN FISH CURING AND PACKING, FRUIT AND VEGETABLE CANNING, AND SLAUGHTERING AND MEAT-PACKING INDUSTRIES, 1910-1930

Group	1910		1920		1930		Change, 1930 over 1910
	Number	Percent- age	Number	Percent- age	Number	Percent- age	
Fish Curing and Packing	2,776	8.2	7,586	11.2	6,796	8.6	....
Percentage change..	....	....	+173.3	....	-10.4	....	+144.8
Fruit and Vegetable Canning	5,290	15.6	10,204	15.1	18,748	23.9	....
Percentage change..	....	....	+ 92.9	....	+83.7	....	+254.4
Slaughtering and Meat Packing	25,897	76.2	49,991	73.7	53,059	67.5	....
Percentage change..	....	....	+ 93.0	....	+ 6.1	....	+104.9
Total	33,963	100.0	67,781	100.0	78,603	100.0	....

vegetable packing gained at the expense of fish and meat packing. The percentage decrease from 1920 to 1930 in both fish and meat packing is undoubtedly due to the diminishing demand for these products following the excessive demand of the World War.

Fish Curing and Packing.—There are so many difficulties encountered in attempting to work out a per capita estimate for the consumption of canned and preserved fish that any figure obtained must be considered approximate. The approximate annual per capita consumption of all fishery products, fresh, smoked, dried, and canned, in the United States, as estimated by the Bureau of Fisheries, averaged 15 pounds for the five-year period 1919-1923. The corresponding figure for the year 1929 is 23, an increase of 8 pounds per capita. This figure taken in conjunction with more detailed reports for the various types of fish products shows no pronounced per capita trend in fish consumption in recent decades.¹³⁰

Table 150, derived from the *Census of Manufactures*, incorporates figures for workers, including laborers. The greater numbers of this table as compared with those for operatives in Table 149 indicate a large proportion of such laborers in the industry. A recent decline in numbers of workers is indicated in both tables. According to Table 54, above, production had increased by 4.6 per cent in 1935 over the 1929 level, although

¹³⁰ United States Department of Commerce, Bureau of Foreign and Domestic Commerce, *Bulletin No. 38*, Domestic Commerce Series, 1930.

TABLE 150

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE CANNED AND PRESERVED FISH* INDUSTRY, 1899-1935†

	1899	1909	1919	1929	1935	Change, 1935 over 1899
Number of establishments	333	398	475	348	274	59
Percentage change		+19.5	+ 19.3	-26.7	-21.3	- 17.7
Wage earners	12,598	9,926	12,437	13,612	13,385	737
Percentage change		+21.2	+ 25.3	+ 9.4	- 2.0	+ 5.8
Wages per worker	\$255	\$ 359	\$ 764	\$ 646	\$ 473	\$ 218
Percentage change		+40.8	+112.8	-15.4	-26.8	+ 85.5
Value added by manufacture per worker	\$557	\$1,093	\$2,112	\$2,029	\$1,604	\$1,047
Percentage change		+96.4	+ 93.2	- 4.0	-20.9	+188.1

* Includes crabs, shrimps, oysters, and clams.

† *Biennial Census of Manufactures*, 1931, pp. 75-76, and 1935, p. 79. In 1937 there were 325 establishments with 18,229 wage earners (*Census of Manufactures*, 1937, "Canning and Preserving," p. 3).

employment was down 2 per cent, output per man-hour having increased by 55 per cent. These facts seem to indicate that a decline in the number of workers may be expected with further mechanization. Other facts bearing upon the subject of this section will be found in the chapter on "Forestry and Fishing."

Fruit and Vegetable Canning.—The fruit- and vegetable-canning industry is concerned with the selection of raw fruits and vegetables, and their preservation through cooking and sealing in tin or glass containers. In California the work is done almost entirely by women, who constitute two-thirds of the working force. Men carry on the heavy work of unloading, trucking, and stacking, as well as the more technical jobs of cooking and maintenance.

The percentages of all fruits and vegetables packed in the United States in 1937 which were packed in certain Western states (chiefly those of the Pacific Coast) were as follows:

Product	Percentage of United States Total	Product	Percentage of United States Total
Apricots	97	Other fruit	46
Berries	81	Asparagus	87
Cocktail and salad	100	Peas	32
Fruit juices	73	Snap beans	21
Peaches	97	Spinach	64
Pears	90	Tomatoes	34
Pineapple	100		

The figures indicate roughly the distribution of these industries as between the West and the East (certain Northeastern states chiefly). Since 1932 the Western pack has doubled, and its share of the nation's pack has increased from 41 to 55 per cent in 1936.¹³¹

The increased consumption of fruits seems to have taken place largely in the form of dried and canned fruit. For example, of the 12 principal fruits it appears that about 7 pounds per capita were processed in 1899 and about 25 pounds a year in 1923-1927. Estimates for the production of canned fruit, as published by the Bureau of the Census, show a large increase in recent years compared with 1889 and 1909 when figures for the industry first became available. This increase is partly absorbed by the increase in the quantity exported but also reflects an increased domestic consumption. Consumption of canned fruit per capita showed a marked increase from 2.3 pounds in 1899 to 10.7 in 1927. Dried fruits showed a similar per capita increase for the same period, from 1.3 pounds in 1899 to 5.2 in 1927.

In the ten-year period, 1917-1927, of the commercial crop, the nation apparently consumed about 300 pounds gross weight of vegetables per capita, of which about 40 pounds were canned, leaving about 260 pounds consumed fresh. To these should be added the produce of home gardens and other non-commercial production, but for this no satisfactory figures are available. The net consumption would be considerably less than the gross owing to waste from trimming, paring, and spoilage. The per capita consumption of canned vegetables more than doubled in 30 years, mounting from approximately 10.3 pounds in 1899, the first census to publish production data, to 27.5 pounds in 1927.¹³²

The commercial canners have made such advances in their art that their products are often actually better than home-prepared fruits and vegetables or other home-canned foods. The cooking is much better controlled than at home, and the vitamin and mineral losses are smaller.

Increased use of commercially canned goods has meant not only less time spent in home canning but a marked spread in

¹³¹ From *Fruit and Vegetable Canning in California*, NYA of California (Anne de G. Treadwell, Director), 1938, p. 3.

¹³² United States Department of Commerce, Bureau of Foreign and Domestic Commerce, *Bulletin No. 38*, Domestic Commerce Series, 1930.

the variety and healthfulness of the diet of medium- and low-income families throughout the bulk of the year when fresh garden products are expensive.

A comparison of the figures for workers in Tables 149 and 151 shows that the great preponderance of workers in the industry are laborers rather than operatives. Both tables show

TABLE 151

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE FRUIT- AND VEGETABLE-CANNING AND -PRESERVING INDUSTRY,* 1899-1935†

	1899	1909	1919	1929	1935	Change, 1935 over
Number of establishments	2,237	3,369	3,805	2,997	2,744	507
Percentage change		+50.6	+ 12.9	-21.2	- 8.4	+ 22.7
Wage earners	44,414	50,042	77,486		116,298	71,884
Percentage change		+12.7	+ 54.8	+27.6	+17.6	+161.8
Wages per worker	\$236	\$310	\$ 735	\$ 758	\$ 607	\$ 371
Percentage change		+31.3	+136.8	+ 3.1	-19.9	+157.2
Value added by manufacture per worker	\$645		\$2,445	\$2,917		\$1,424
Percentage change		+37.1	+175.3	+19.3		+221.0

* Includes canned and dried fruits and vegetables, preserves, jellies, fruit butters, pickles and sauces.

† *Biennial Census of Manufactures*, 1931, p. 74, and 1935, p. 78. In 1937 establishments numbered 2,772 and wage earners 137,064 (*Census of Manufactures, 1937*, "Canning and Preserving," p. 2).

positive percentage increases in recent decades, although there is a notable slackening in this increase from 1929 to 1935 for all wage earners. On the whole, wages per worker have failed to keep pace with value added by manufacture per worker, although this trend was reversed from 1929 to 1935.

Slaughtering and Meat Packing.—Meat packing first started as an industry when railroad transportation came into being. New mechanical inventions such as the development of refrigeration, cold storage, and rapid transportation made meat packing an all-year industry instead of a seasonal one. The slaughtering and meat-packing industry is the largest engaged in the production of food products and is also one of the largest and most important industries in the United States. Consumers living in the large cities and great industrial centers are entirely dependent, and many of those living in the rural

districts are to a very large extent dependent, upon the large packing companies for meat and for meat products. During the period 1933-1937, four of the great packing concerns handled about 42 per cent of the meat production. The large companies have branch storage houses in practically all important cities throughout the country, always well supplied to meet the demands of the local retail market. Refrigerator cars, owned, operated, and repaired by these large packing companies have regular routes, delivering to branch villages in which there is no storage.¹³³

This industry has long been characterized by a minute subdivision of labor. Machinery is extensively used in conveying the carcasses between processes; in fact a characteristic feature of a packing plant is a conveyor moving just fast enough to allow time for each successive processing operation. However, the actual processing operations are in large part manual rather than machine. The variety in size and contour of the carcasses makes the application of machine methods difficult except in the conveying and packaging phases.¹³⁴ The auto industry copied its assembly-line technique from meat packing.¹³⁵

There has been a drastic decline in the amount of meat exported since the turn of the century. In million pounds the amount was 1,286 in 1900, a figure that had fallen to 491 by 1914. The World War required a heavy export during the years 1915-1920. The figure fell to 360 by 1928. There has also been an over-all decline in the per capita consumption of meat in this country during the same period. From 1900 to 1910 the figures ranged between 138 and 155 pounds, whereas during the next decade the range extended from 120 to 146 pounds. In 1924 the figure reached 150 pounds, but the decline thereafter was a fairly steady one, arriving at 138 in 1928. The per capita consumption of lard for the years of the century has not greatly varied, the figure for 1928 being 1.5 pounds larger than that of 1900.¹³⁶

¹³³ United States Department of Labor, Bureau of Labor Statistics, *Bulletin No. 576*, p. 73.

¹³⁴ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, p. 117.

¹³⁵ *Meat Packing*, NYA of Illinois, Research Report, No. 6.

¹³⁶ John Roberts, *Meat Production, Consumption and Foreign Trade in the United States, Calendar Years 1900-1927*, United States Department of Agriculture, Bureau of Animal Industry.

TABLE 152

COMPARISON OF THE NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE WHOLESALE MEAT-PACKING INDUSTRY, 1899-1935*

		1919		1935		Change, 1895 over
Number of establishments	882	1,221	1,304	1,277	1,223	341
Percentage change		+38.4		- 2.1	- 4.2	+ 38.7
Wage earners		87,813		122,505	116,620	48,234
Percentage change		+28.4	+ 83.3	-23.9	- 4.8	+ 81.9
Wages per worker	\$ 486	\$ 574	\$1,301	\$1,353	\$1,170	\$ 684
Percentage change .....	....	+18.1	+127.2	+ 4.0	-13.5	+140.8
Value added by manufacture per worker	\$1,488		\$2,878	\$3,758	\$2,850	\$1,362
Percentage change		+25.1	+ 54.0	+30.5	-24.2	+ 91.5

* *Biennial Census of Manufactures, 1931*, p. 161, and 1935, pp. 179-81. The number of establishments in 1937 was 1,160 and the average number of wage earners 127,477 (*Census of Manufactures, 1937, "Meat Packing,"* p. 2).

From a comparison of the figures for workers of Table 152 with those of the census (Table 149) it is clear that a very large number of laborers are involved in the meat-packing industry. A recent slackening of need for workers is indicated by both tables. While wages per worker increased much faster than value added by manufacture per worker during the war period, the reverse was true for the decade ending in 1929. From 1929 to 1935 value added per worker has declined more rapidly than have wages per wage earner.

Sex Composition of the Operatives Groups in Fish Curing and Packing, etc.

The percentage distribution of operatives, by sex, is shown in the following tabulation:

Group	1910		1920		1930	
	Male	Female	Male	Female	Male	Female
Fish Curing and Packing	64.3	35.7	57.5	42.5	54.4	45.6
Fruit and Vegetable Canning .	40.2	59.8	38.2	61.8	27.7	72.3
Slaughtering and Meat Packing .	90.7	9.3	83.8	16.2	81.1	18.9

An increase in the percentage of female workers in all three divisions is to be noted throughout the period indicated.

Grain, Flour, and Feed Mills (Millers Included)

The milling group increased from 41,582 workers in 1870 to a maximum number of 53,440 in 1880 and declined in successive decades until 1920, when the number rose somewhat above that for 1910. However, the number in 1930 (22,818), was considerably less than that recorded in any previous census of the sixty years. This decline was registered during the period of greatest increase in the production of flour, the mechanization of the industry, and its concentration into fewer units of greater plant capacity. How the number of millers and operatives in grain, flour, and feed mills listed by the census compare with production of flour may be seen in Table 153.

TABLE 153
PRODUCTION OF FLOUR AND NUMBER OF MILLERS, 1880-1930*

Census	Flour Million Barrels	Percentage Change	Number of Millers, etc.	Percentage Change
1880	62.8	....	53,440	....
1890	83.5	+33.0	52,841	- 1.1
1900	104.9	+25.6	40,548	-23.3
1910	108.0	+ 3.0	27,144	-33.1
1920	130.4	+20.7	31,384	+15.6
1930	123.6	- 5.2	22,818	-27.3
1930 over 1880	+ 60.8	+96.8	-30,622	-57.3

* Figures on flour milled taken from Arthur F. Burns, *Production Trends in the United States since 1870*, pp. 298-99, National Bureau of Economic Research, 1934. Figures on number of workers taken from the census. As census figures cover available workers, including both employed and unemployed millers, the actual number engaged in producing the amount of flour shown in the table is somewhat less than this total of available workers. Hence the table is an understatement of the increase in productivity per worker. For changes from 1929 to 1936, see Table 54, above.

Thus, a loss of over half the number of workers in this group was sustained during the above fifty years, while an increase of almost double the quantity of flour was milled. There was, however, an increase of 6,000 common laborers to help with this production from 1910 to 1930, while a 5,000 decrease of semiskilled was taking place. The period 1919 to 1929 was one of intensive centralization of the flour-milling industry, made necessary by the increasing cost of operations and made possible by the facts that transportation had developed suitable carrying facilities and that power machinery had been perfected which increased enormously the per-worker productivity of the larger mills. In the face of such advances and the development of trade names and brands, small independent mills could not survive.

This process of centralization was continuous as the country

became settled, and effected a reduction in the number of mills from 9,209 in 1919 to 4,002 in 1929. The loss in number of such establishments was 56 per cent in the ten-year period.¹³⁷ In many of the smaller mills, where the miller was both worker and proprietor, the result was a loss of employment not only to a skilled artisan but to a businessman as well. In 1924 the Federal Trade Commission reported that concentration in the milling of flour had advanced to a stage where eight companies operating 87 mills had each produced over a million barrels of flour that year and together turned out a total of over 30 million barrels, or 27 per cent of all flour milled in the United States.¹³⁸ The work of the miller has been changed substantially as improved machinery has been installed in the mills, until recently he has become little more than an ordinary factory hand.

Liquors and Beverages

Conditions in the liquors and beverages industry so altered as a result of prohibition and repeal of prohibition laws that the census figures do not indicate the true labor force engaged in manufacturing liquors and beverages. This is an excellent illustration of the fact that public policy both creates occupations and destroys them. The number of workers listed as operatives in liquor and beverage establishments increased from 14,578 in 1870 to a maximum of 34,625 in 1900, and was cut in half by the enactment of Prohibition. The loss in number of such workers from 1900 to the date of Prohibition came in the face of a greatly expanded production of liquor and other beverages, and was the result of increased productivity per worker due to invention and installation of labor-saving machinery, the widespread use of electric power, and the concentration of manufacture into fewer but larger and more efficient units. Because of the great improvements in communication and transportation, even local bottling works disappeared with startling rapidity, and distribution was made through a relatively few strategically located outlets.

These technological gains were renewed and still others made when Repeal brought the dormant liquor industry to life

¹³⁷ Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, p. 241. By 1937 the number of establishments was 2,381 (*Census of Manufactures, 1937*, "Flour and Other Grain Mill Products," p. 1).

¹³⁸ Harry Laidler, *Concentration of Control in American Industry*, pp. 233-34. Thomas Y. Crowell Company, New York, 1931.

again. It is improbable, therefore, that the revived liquor trade will either reinstate all old workers or add new ones to form a corps comparable in size to the peak number of pre-Prohibition days as recorded in the census of 1900.

In 1930 there were 11,187 workers listed in the Manufacturing and Mechanical category as liquor and beverage makers and operatives. They constituted only .02 per cent of the gainfully employed. In comparison with the development of that body, such workers increased more rapidly from 1870 to 1890, but declined thereafter. Even though Repeal has augmented their number somewhat, liquor and beverage manufacture gives employment directly to only a small group, which can exert no appreciable influence upon the course of development of the national labor force.¹⁸⁹

Salt Works

The number of salt-well and salt-works operatives totaled 4,124 in 1930, a decline of 1,348 from the peak number of such workers recorded by the census in 1920, the highest point reached during the sixty years under review. The number of salt workers in the labor force in successive decades was determined by the character of salt production—that is, whether salt was mined or recovered from water—the amount of mechanization used in production, the effective demand for salt in the expanding population, and the centralization of the industry into fewer, more efficiently operated units. The number of salt workers increased somewhat from 1880 to 1890, remained stationary in 1900, advanced sharply in 1910, and again increased in 1920. The group was somewhat smaller in 1930 than in 1910. How the number of salt workers compares with the production of salt is shown in Table 154.

Once more, as is so characteristic of an increasing number of productive industries, the figures reveal the important fact that while workers have increased in number their output is disproportionately greater. The number of millions of barrels of salt produced increased almost five times as fast as the number of workers during the sixty years. Only a greatly expanded effective demand in the market could possibly change conditions sufficiently to prevent an actual decrease in the number of workers used in its production. From 1920 to 1930 output

¹⁸⁹ See also *Census of Manufactures, 1935-1937*.

TABLE 154

NUMBER OF SALT WORKERS COMPARED WITH SALT PRODUCTION, 1880-1930*

Census	Salt Produced, Million Barrels		Salt Workers	
	Amount	Percentage Change	Number	Percentage Change
1880	6.0	....	1,431	....
1890	8.9	+ 48.3	1,765	+ 23.3
1900	20.9	+134.8	1,775	+ 0.6
1910	30.3	+ 45.0	4,365	+145.9
1920	48.9	+ 61.4	5,472	+ 25.4
1930	61.0	+ 24.7	4,124	- 24.6
1930 over 1880 . . . . .	....	+916.6	....	+188.2

* Figures on production of salt taken from Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, 1934, pp. 292-93; figures on number of salt workers from: *Fifteenth Census of the United States, 1930*, Vol. IV, "Occupations by States"; *Twelfth Census of United States, 1900*, Special Reports, "Occupations, 1904," Bureau of Census (census figures refer to "available" workers). *Census of Manufactures, 1937*, "Salt," p. 11, shows that from 1929 to 1937 the number of establishments declined from 58 to 46 and the average number of wage earners from 5,458 to 4,416.

increased 24 per cent, while the labor force decreased 24 per cent.

In comparison with the total of gainfully employed, the Salt Works group assumed a slightly greater importance in 1910 than in 1900 and advanced slightly again in 1920. Salt workers constituted only .008 per cent of the total of the gainfully employed in 1930, a percentage identical with the 1880 figures. While there is some prospect that the number of salt workers will further decline in the immediate future, the group is too small for even an unusual fluctuation to affect seriously the character of the national labor force.

Sugar Refineries

Sugar factory and refinery operatives numbered 3,778 in 1930, a decrease of 28 per cent from their peak in 1920. In 1930 this group constituted .008 per cent of all gainful workers. Its numerical trend has been somewhat unsteady: increasing from 1,609 in 1870 in successive decades to 2,727 in 1900, then dropping to 1,871 in 1910, and climbing thereafter to the 1920 and the 1930 numbers.

The amount of raw sugar used to supply the United States, requiring refining before use, has increased since 1870 as indicated in Table 155, including also the number of operatives available for refining the product.

The increase in the amount of raw sugar consumed was over six times the increase in the labor force available for sugar-refinery operations. In 1930, as a result of several technological

TABLE 155

AMOUNT OF RAW-SUGAR CONSUMPTION AND NUMBER OF SUGAR REFINERY OPERATIVES, 1870-1930*

Year	Raw-Sugar Consumption		Sugar Refinery Operatives	
	Million Pounds	Percentage Increase	Number	Percentage Change
1870	1,284	....	1,609	....
1880	1,998	55.6	2,327	+ 24.6
1890	3,215	60.9	2,616	+ 12.4
1900	4,336	34.9	2,727	+ 4.2
1910	6,388	47.3	1,871	- 31.4
1920	9,822	53.8	3,806	+103.4
1930	12,445	26.7	3,778	- .7
1930 over 1870		869.2	....	+134.8

* Figures on sugar consumption taken from Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, 1934, pp. 294-95; figures on number of workers taken from: *Fifteenth Census of the United States, 1930*, Vol. IV, "Occupations by States"; *Twelfth Census of United States, 1900*, Special Reports, "Occupations, 1904," Bureau of Census (census figures refer to "available" workers).

factors at work in the sugar industry, the amount of raw sugar consumed increased 26 per cent over 1920, although the number in the operatives group actually declined .7 per cent.¹⁴⁰

The sugar-refining industry was early subjected to severe competition. In the period from 1887 to 1891 a single company, the Sugar Refineries Company, had secured a virtual monopoly of the refining business of the country. Since that time the beet-sugar industry has been developed as a domestic activity, competition has been revived, and two corporations have finally become dominant, controlling half of the refinery business of the nation.¹⁴¹

Other Food Factories

All other factories engaged primarily in the processing or manufacture of foods are grouped together by the census under the caption "Other Food Factories." Data have been segregated since 1900 which show in each successive decade a large increase in the number of operatives in such factories.

The number of other food factory workers totaled 25,898 in 1930, when it was .05 per cent of the total gainfully employed. The number of such workers is not sufficiently large, however, for this trend to influence materially the distribution of the total gainfully employed.

¹⁴⁰ In Table 54, above, it appears that in 1936 cane sugar refining was down 16.3 per cent from the 1929 level, with employment showing a decrease of 5 per cent and output per man-hour an increase of 39.3 per cent.

¹⁴¹ Harry Laidler, *Concentration of Control in American Industry*, Thomas Y. Crowell Company, New York, 1931, p. 219.

L. CIGAR AND TOBACCO WORKERS

General Characteristics (Tables 156 to 158)

There were 103,715 cigar, cigarette, snuff, and tobacco workers in the United States at the 1930 census. This group com-

TABLE 156

NUMBER OF CIGAR AND TOBACCO WORKERS:* PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1900

	1870	1880	1890	1900	1910	1920	1930
Number of cigar and tobacco workers, male and female	40,271	77,045	111,625	131,452	151,801	145,222	103,715
Percentage of total population	0.104	0.153	0.178	0.172	0.165	0.137	0.084
Percentage of all gainful workers, male and female	0.322	0.443	0.491	0.452	0.398	0.349	0.212
Percentage of all in Manufacturing and Mechanical Industries	1.163	1.463	1.581	1.452	1.444	1.166	0.761
Number of male cigar and tobacco workers ..	36,137	66,177	83,634	87,955	79,956	61,262	35,767
Percentage of all male gainful workers .....	.339	.449	.444	.370	.265	.185	.094
Percentage of all males in Manufacturing and Mechanical Industries	1.170	1.447	1.399	1.154	.919	.582	.305
Number of female cigar and tobacco workers ..	4,134	10,868	27,991	43,497	71,845	83,960	67,948
Percentage of all female gainful workers..	.225	.411	.715	.818	.890	.982	.632
Percentage of all females in Manufacturing and Mechanical Industries	1.102	1.568	2.589	3.035	3.951	4.351	3.602

* Cigar- and tobacco-factory operatives transferred from Miscellaneous Industries (Manufacturing and Mechanical Industries) in 1870, 1880, 1890, and 1900.

prised .08 per cent of the total population, .2 per cent of the total of gainfully employed, and .7 per cent of the entire Manufacturing and Mechanical category.

In percentage of the total population the number in the Cigar and Tobacco Workers group increased in the period from 1870 to 1890 but decreased from 1890 to 1930. This group

likewise increased in the percentage that it was of the total labor force of the nation until 1890; but its relative decline thereafter was so great that by 1920 its proportion of the gainful workers was approximately the same as in 1870, and by 1930 it occupied a place of less significance in that labor force than at any previous period recorded in the census. This situation is shown in Table 156, where it will be observed that the long-term trend indicates that cigar and tobacco workers are assuming a much less important place in the labor force of the nation.

During the thirty years from 1870 to 1900 the number of cigar and tobacco workers increased 91,181 but during the thirty years from 1900 to 1930 decreased 27,737. The maximum number listed was 151,801 in 1910, but the decline from 1910 to 1930 was continuous. The number of such workers in 1930 was less than in 1890 or in any census thereafter. This decrease of workers occurred simultaneously with the period of the most phenomenal increase in production ever made in the tobacco business, and attests the drastic change in methods which resulted in greatly increased per-worker productivity in the industry. Table 156 deals with the labor force listed in the Census of Occupations and therefore represents the entire available labor force—those who actually worked to produce the goods as well as those partly employed or even entirely displaced.

A comparison of the total number of workers actually used in the tobacco manufacturing industry, and the output of cigarettes and cigars is given in Table 157. The total number of these workers (indicated in the third column under Number of Workers) increased 118 per cent in the 50 years preceding 1930, whereas the output of cigarettes (indicated in the third column under Production) increased 20,550 per cent and cigar production increased 160 per cent. The output noted shows the actual production, which is governed by the demands of the purchasing market and must not be confused with the maximum production of which equipment and available labor force are capable.

The figures on production reflect the changing tastes of the consuming public. The volume of cigarette smoking has increased enormously with the change in custom since the last century, when it was considered unbecoming to smoke a cigar-

TABLE 157

COMPARISON OF PRODUCTION OF CIGARS AND CIGARETTES AND NUMBER OF WORKERS, 1875-1935 (PERCENTAGE BASE, 1880)

Year	Number of Workers				Production			
	Cigars ^a	Cigarettes ^a	Tobacco Occupations ^b	Percentage Indexes	Number of Cigars (in Millions) ^c	Percentage Indexes	Number of Cigarettes (in Millions) ^c	Percentage Indexes
1870 .....	.....	.....	26,049	.....	.....	.....	15	2.5
1875 .....	.....	.....	.....	.....	.....	.....	40	6.7
1880 .....	.....	.....	53,297	100.0	2,510	100.0	595	100.0
1885 .....	.....	.....	.....	.....	.....	.....	1,100	185.0
1890 .....	.....	.....	87,000	163.0	4,229	168.0	2,500	420.0
1900 .....	.....	.....	103,462	.....	5,566	221.0	3,870	651.0
1904 .....	.....	.....	159,406	299.0	.....	.....	.....	.....
1910 .....	.....	.....	.....	.....	6,810	271.0	10,000	1,680.0
1914	140,955	11,842	178,872	335.0	.....	.....	.....	.....
1916 .....	.....	.....	.....	.....	.....	.....	19,250	3,235.0
1918 .....	.....	.....	.....	.....	7,365	293.0	41,592	6,990.0
1920 .....	.....	.....	.....	.....	8,097	322.0	48,091	8,080.0
1921	111,855	21,502	149,985	281.0	6,726	268.0	52,100	8,750.0
1923 .....	.....	.....	146,337	274.0	6,950	277.0	66,734	11,220.0
1925 .....	.....	.....	132,132	248.0	6,463	257.0	82,264	13,820.0
1927	94,556	21,618	129,299	243.0	6,519	260.0	99,820	16,780.0
1929	84,166	21,142	116,119	218.0	6,519	260.0	122,822	20,650.0
1930 .....	.....	.....	.....	.....	5,890	234.0	.....	.....
1931	68,182	20,146	99,769	187.0	5,320	212.0	120,868	20,310.0
1933	54,558	22,544	87,325	164.0	4,340	173.0	114,336	19,220.0
1935	56,019	24,447	90,543	170.0	4,760	189.0	139,903	23,520.0

^a Figures from *Census of Manufactures* for the various years and *Statistical Abstract*, 1936.

^b The figures in this column are taken from the *Census of Manufactures* for the various years and from the *Survey of Current Business Supplements*, 1932. They sometimes include workers producing chewing and smoking tobacco and snuff as well as cigars and cigarettes and are not always precisely comparable.

^c The figures in this column are selected from various sources or are estimated by the authors.

ette. Cigar smoking reached its maximum in 1920, the yearly output for six years thereafter fluctuating around a midpoint of some 6,500,000,000 cigars. This would seem to indicate that the cigar industry has reached a stationary level and may be approaching a decline in relation to the total population.

While machinery had already been introduced to displace hand workers during the peak period of 1910, its widespread effect had not then been felt nor had the enlarged market for tobacco products been developed. The skillful use of advertising to cultivate tastes and to soothe prejudices, the World War idea that nothing should be denied the fighting force of the nation, and the eventual adoption of cigarette smoking by

women combined to create a greatly increased demand for cigarettes. The period since the war shows the results of both forces: mechanization actually displaced workers in the tobacco industry, while the swollen demand greatly increased the output.

The rate of growth of the tobacco trades in comparison with that of the total population and that of all gainful workers may be seen in Table 158.

TABLE 158

PERCENTAGE CHANGE IN TOBACCO TRADES WORKERS COMPARED WITH THAT OF THE TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Census	Total Population	All Gainful Workers	Tobacco Trades Workers		
			Total	Males	Females
1870 .....	....	....	....	....	....
1880	+ 30.1	+ 39.1	+ 91.3	+ 83.1	+ 162.9
1890	+ 24.8	+ 30.7	+ 44.9	+ 26.4	+ 157.6
1900	+ 21.3	+ 27.9	+ 17.8	+ 5.2	+ 55.4
1910	+ 21.0	+ 31.3	+ 15.5	- 9.1	+ 65.2
1920	+ 14.9	+ 9.0	- 4.3	- 23.4	+ 16.9
1930	+ 16.1	+ 17.3	- 28.6	- 41.6	- 19.1
1930 over 1870	+218.4	+290.5	+157.5	- 1.0	+1,543.6

Only in the decades ending in 1880 and 1890, when the tobacco industry was becoming established on a commercial basis, did the rate of gain in numbers of workers exceed the rate of growth of the total population or of the total gainfully employed. After that time the number of tobacco workers increased more slowly than either of these other groups. In fact, the Cigar and Tobacco Workers group records losses after 1910, losses of males since 1900 and losses of females from 1920 to 1930, while the total population and the national labor force has shown a continuous expansion at a reduced rate during these years.

Sex Composition of the Cigar and Tobacco Workers Group

In the Colonies, and for some time after the United States was created, the making of cigars was a household industry engaging the spare time of women. As the nation became settled and industrialized, cigar making became a skilled hand trade followed by men; housewives were displaced in this occupation by skilled male cigar makers who immigrated from Germany and Spain.¹⁴² But about the year 1869 men again

¹⁴² Lucy Winsor Killough, *The Tobacco Products Industry in New York and Its Environs*, Regional Plan of New York and Its Environs, 130 E. Twenty-second Street, New York, 1924, pp. 21-26.

began to be displaced by women in the tobacco trades. Immigrants from Bohemia (where cigar making was a trade followed almost exclusively by women) began to arrive in New York and other large Eastern seaboard cities and the women among them were employed as full-time workers in the domestic production of cigars. The employer furnished raw materials and owned and marketed the product, while the women performed the work at piece rates in their tenement homes.

The industrial history of the cigar trade is filled with a struggle to better the circumstances of laborers, to resist the encroachment of machinery and women's invasion of men's work. But the forces of economic advance have been irresistible. The results are those revealed in the following display of the sex composition of the Cigar and Tobacco Workers group:

Census	Percentage	
	Males	Females
1870	89.7	10.3
1880	85.9	14.1
1890	74.9	25.1
1900	66.9	33.1
1910	52.7	47.3
1920	42.2	57.8
1930	34.5	65.5

Women advanced steadily from 10 per cent of the number of cigar and tobacco workers in 1870 to 65 per cent in 1930. In 1870 there were nine men to one woman, but by 1930 women were almost twice as numerous as men. Women made their greatest inroads at the time of the widespread use of machinery and the increase in size of factories. Both sexes, however, have been forced to bow to the increasing productivity of the machine; for, despite the enormously increased demands for tobacco products, the cigar and tobacco industry has, by the use of machinery, actually reduced the number of workers.

The Role of the Machine

Technological advances made in management and manufacturing processes are almost entirely responsible for the conditions unfavorable to the tobacco workers. Here is perhaps the best example of the over-all displacement of workers by machines in any industry which has experienced continuous growth and reaped increasing profits; but even this record may not yet be complete. The increase noted in output of cigars and

cigarettes has been made in response to a demand which is still growing. However, with the abatement in the rate of increase of the national population and with the expansion of the tobacco output, there is the possibility of a maximum consumption being reached in the near future. The other factor which has not yet dealt the full force of its blow to workers in tobacco manufacture is the continuing introduction of even more labor-saving devices. Finally, should the tobacco trust, which was dissolved by Supreme Court order, be re-established, more efficient production and merchandizing methods may still further reduce the need for labor.

Late in the decade 1860-1870, after many futile attempts, the cigar mold was finally invented and used successfully.¹⁴³ Its invention marked the beginning of a struggle between employers and organized workers, a struggle characterized by heroism, desperation, and suffering which has continued to this day in vain attempts of workers to prevent the degrading of their skill, the reduction of their earnings, and eventually the permanent displacement of many workers in the tobacco industry. The cigar mold made it possible to subdivide the work into simplified operations, to lessen the skill required, to shorten the training period for apprentices, and to permit factory conditions whereby women could be profitably employed.

In the decade 1880-1890 another invention appeared to further reduce the skill required of the cigar maker. The suction table made it possible for comparative novices in the trade to do the work of wrapper-cutting on a par with old hands. Workers attempted to resist the introduction of this table by refusing the union label to firms using it, but to no avail. About 1890 a long-filler bunching machine appeared, and in 1900 an improved scrap-filler bunching machine was successfully used. Both greatly increased productivity and reduced the skill required of workers. In 1917 a patent was granted the first successful machine for making a completely headed, long-filler cigar in one continuous process. Its value to manufacturers was so evident that within ten years it was used to produce 50 per cent of the total national output of cigars.¹⁴⁴

¹⁴³ John P. Troxell, "Machinery and the Cigar Makers, in *Quarterly Journal of Economics*, Vol. XLVIII, November 1933.

¹⁴⁴ "Technological Changes in the Cigar Industry and Their Effects on Labor," *Monthly Labor Review*, December 1931, United States Department of Labor, Bureau of Labor Statistics, p. 11.

The labor displacement caused by the introduction of this new cigar maker is indicated in Table 159.

TABLE 159
COMPARISON OF MACHINE AND HAND PRODUCTION IN THE
CIGAR INDUSTRY

	1917	1920	1925	1930
Number of cigars produced by machines	1,500,000	371,250,000	956,800,000	2,768,750,000
Machine employees required	9	2,228	5,742	16,610
Estimated number of hand workers required for same production	20	4,950	12,757	36,910
Workers displaced by machinery ...	11	2,732	7,015	20,300

In ten years the cigar-making machine accounted for about half of the total production. These machines are operated almost entirely by women. Should they be installed in all plants now making cigars it probably would mean the permanent displacement of almost the entire force of males now engaged in the industry. Cigar-making machines are costly, and this has tended to retard their introduction. Studies made by the Department of Labor indicate that manufacturers unanimously agree that the ultimate saving in labor costs and increased output was decidedly to the advantage of machine installation, the savings being from 50 to 100 per cent.¹⁴⁵ At the present rate of introduction the machine will probably attain full dominance of the field in another ten years; only a few superior cigars will then be made by hand, and such work will require relatively few of the labor force engaged in the tobacco industry.

Thus an industry which already has reduced male workers to a point where their number in 1930 was less than in 1870 now faces the possibility that within the next ten to twenty years further reductions will displace most male workers. Women workers, who will supplant male cigar makers in the new role of semiskilled machine tenders, can look forward to no appreciable increase in their total number because the machines are continually being made to operate more and more automatically.

¹⁴⁵ *The Effects on Women of Changing Conditions in the Cigar and Cigarette Industry*, United States Department of Labor, Women's Bureau, Bulletin No. 100.

Furthermore, the shift in production is away from cigars and toward the more popular cigarette. Here the enormous increase in production, which may continue for some time, has been achieved without a marked increase in the number of workers.¹⁴⁶ Cigarettes have been machine-made since their first commercial production. Most machine tenders in this branch of the tobacco industry have been women.

All the evidence available supports the view that technological advance has broken down the skilled craft of cigar making. Machine production has greatly increased per-worker productivity. The preference of the public for cigarettes rather than cigars and the transfer of the work to women, the enormously increased output achieved with a long-run decline in the tobacco industry as a whole in labor used, all combine to present a rather dismal picture for workers in this industry.¹⁴⁷

M. CHEMICAL AND ALLIED INDUSTRIES

General Characteristics (Tables 160 to 165)

Chemical industries produce either finished products or materials essential to the production of many manufactured articles. In fact few manufacturing or mechanical occupations can be listed which do not depend in some measure upon chemistry or the chemical industries. The ten subgroups making up Chemical and Allied Industries within the category of Manufacturing and Mechanical Industries are therefore to be regarded as a somewhat arbitrary arrangement made primarily for convenience. Chemical industries, themselves, are not great users of labor, although they do provide other industries with essential materials which in turn furnish employment to a great many persons. The most numerically significant subgroup is made up of workers within the Chemical and Allied Industries group in rubber factories.

This group contained 178,730 operatives in 1930, which was

¹⁴⁶ Employment since 1931 has been upward. The over-all percentage increase in the average number of workers from 1929 to 1936 was 14.1 and that of man-hour output 36.3 (Table 54, above).

¹⁴⁷ A mimeographed publication of the NYA of Kentucky (R. K. Salyers, State Director) has the title *The Tobacco Industry in Louisville and Kentucky*, Louisville, Kentucky, February 1938. See also, the valuable publication, *Cigar Makers—After the Lay-off*, WPA National Research Project, Report No. L-1, December 1937, for a vivid picture of the effects of mechanization in this industry.

TABLE 160

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN CHEMICAL AND ALLIED INDUSTRIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Charcoal and Coke Works	{ 3,834 21.4	{ 5,851 15.9	{ 8,704 14.3	{ 14,436 15.8	{ 1,634 2.2 (1.5)	{ 1,722 1.1 (.9)	{ 1,537 .9 (.7)
Explosives, Ammunition, and Fireworks Factories	{ 761 4.2	{	{ 1,385 2.3	{ 4,136 4.5	{ 5,263 7.2 (4.9)	{ 7,379 4.7 (4.0)	{ 5,904 3.3 (2.7)
Fertilizer Factories	{ 816 1.8	{ 1,383 3.7	{ 732 1.2	{ 1,310 1.4	{ 635 .9 (.6)	{ 1,407 .9 (.8)	{ 1,538 .9 (.7)
Petroleum Refineries	{ 1,747 9.7	{ 3,929 10.7	{ 5,624 9.2	{ 6,615 7.2	{ 1,739 2.4 (1.6)	{ 8,891 5.6 (4.8)	{ 25,274 14.1 (11.7)
Gas Works	{ 2,066 11.6	{ 4,695 12.7	{ 5,224 8.6	{ 6,955 7.6	{ 5,732 7.9 (5.4)	{ 9,462 6.0 (5.1)	{ 13,896 7.8 (6.4)
Paint and Varnish Fac- tories	{	{	{	{	{ 3,920 5.4 (3.7)	{ 5,521 3.5 (3.0)	{ 8,297 4.6 (3.8)
Rubber Factories	{ 3,886 21.7	{ 6,350 17.2	{ 16,162 26.5	{ 21,866 23.9	{ 31,593 43.4 (29.6)	{ 86,204 54.6 (47.0)	{ 80,835 45.2 (37.4)
Soap Factories	{ 1,942 10.8	{ 2,923 7.9	{ 3,450 5.7	{ 4,020 4.4	{ 4,443 6.1 (4.2)	{ 6,288 4.0 (3.4)	{ 5,289 3.0 (2.4)
Turpentine Farms and Distilleries	{ 2,478 13.8	{ 7,450 20.2	{ 15,266 25.1	{ 24,735* 27.0	{ 1,449 2.0 (33,962)	{ 1,138 .7 (25,830)	{ 1,368 .8 (37,620)
Other Chemical Factories..	{ 886 4.9	{ 4,308 11.7	{ 4,874 7.2	{ 7,502 8.2	{ 16,444 22.6 (15.4)	{ 29,746 18.9 (16.2)	{ 34,742 19.4 (16.1)
Total	{ 17,936 99.9	{ 36,889 100.0	{ 60,921 100.1	{ 91,575 100.0	{ 72,852 100.1 (33,962) (100.0)	{ 157,758 100.0 (25,830) (99.9)	{ 178,730 100.0 (37,620) (99.9)

* Figures in parentheses represent laborers; percentages in parentheses include laborers.

* Turpentine distillers, numbering 7,099, were included in Miscellaneous Manufacturing and Mechanical Industries in 1900.

TABLE 161

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
CHEMICAL AND ALLIED INDUSTRIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Charcoal and Coke Works	{ 3,829 24.7	{ 5,851 17.3	{ 8,689 16.7	{ 14,405 17.9	{ 1,618 3.3 (2.0)	{ 1,692 1.4 (1.2)	{ 1,572 1.1 (.9)
Explosives, Ammunition, and Fireworks Factories	{ 665 4.3	{	{ 963 1.8	{ 2,745 3.4	{ 2,858 5.9 (3.5)	{ 4,811 4.0 (3.4)	{ 3,322 2.4 (1.9)
Fertilizer Factories	{ 310 2.0	{ 1,371 4.0	{ 726 1.4	{ 1,308 1.6	{ 622 1.3 (.8)	{ 1,352 1.1 (.9)	{ 1,484 1.1 (.8)
Petroleum Refineries	{ 1,708 11.0	{ 3,897 11.5	{ 5,587 10.7	{ 6,572 8.2	{ 1,969 3.4 (2.0)	{ 3,229 6.9 (5.7)	{ 24,781 17.8 (14.0)
Gas Works	{ 2,082 18.4	{ 4,680 13.8	{ 5,219 10.0	{ 6,940 8.6	{ 5,689 11.7 (6.9)	{ 9,294 7.8 (6.4)	{ 13,873 10.9 (7.8)
Paint and Varnish Fac- tories	{	{	{	{	{ 3,292 6.8 (4.0)	{ 4,686 3.9 (3.2)	{ 7,266 5.2 (4.1)
Rubber Factories	{ 2,035 13.1	{ 4,292 12.7	{ 9,706 18.6	{ 14,492 18.0	{ 21,170 43.4 (25.7)	{ 67,370 56.2 (46.4)	{ 59,546 42.7 (33.7)
Soap Factories	{ 1,900 12.3	{ 2,718 8.0	{ 3,051 5.9	{ 3,289 4.1	{ 2,516 5.2 (3.1)	{ 3,239 2.7 (2.2)	{ 3,405 2.4 (1.9)
Turpentine Farms and Distilleries	{ 2,294 14.8	{ 7,325 21.6	{ 14,936 23.7	{ 24,454 30.4	{ 1,441 3.0 (38,595)	{ 1,130 .9 (25,395)	{ 1,360 1.0 (37,313)
Other Chemical Factories..	{ 662 4.3	{ 3,727 11.0	{ 3,179 6.1	{ 6,311 7.8	{ 7,870 16.1 (9.6)	{ 17,984 15.0 (12.4)	{ 22,814 16.4 (12.9)
Total	{ 15,485 99.9	{ 33,861 99.9	{ 52,056 99.9	{ 80,516 100.0	{ 48,745 100.1 (38,595)	{ 119,787 99.9 (25,395)	{ 139,423 100.1 (37,313)
					(100.1)	(100.1)	(99.9)

* Figures in parentheses represent laborers; percentages in parentheses include laborers.

TABLE 162

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN CHEMICAL AND ALLIED INDUSTRIES, 1870-1930*

Group	1870	1880	1890	1900	1910	1920	1930
Charcoal and Coke Works	{ 5 .2	{	{ 15 .2	{ 31 .3	{ 16 .1 (.1)	{ 30 .1 (.1)	{ 15 ^a
Explosives, Ammunition, and Fireworks Factories	{ 96 3.9	{	{ 422 4.8	{ 1,391 12.6	{ 2,405 10.0 (9.8)	{ 2,568 6.9 (6.7)	{ 2,582 6.6 (6.5)
Fertilizer Factories	{ 6 .2	{ 12 .4	{ 6 .1	{ 2 ^a	{ 13 .1 (.1)	{ 55 .1 (.1)	{ 54 .1 (.1)
Petroleum Refineries	{ 89 1.6	{ 32 1.1	{ 37 .4	{ 43 .4	{ 70 .3 (.3)	{ 662 1.7 (1.7)	{ 493 1.3 (1.2)
Gas Works	{ 4 .2	{ 15 .5	{ 5 .1	{ 15 .1	{ 43 .1 (.2)	{ 168 .4 (.4)	{ 23 .1 (.1)
Paint and Varnish Fac- tories	{	{	{	{	{ 628 2.6 (2.6)	{ 835 2.2 (2.2)	{ 1,031 2.6 (2.6)
Rubber Factories	{ 1,851 75.5	{ 2,053 68.0	{ 6,456 72.3	{ 7,374 66.7	{ 10,423 43.2 (42.6)	{ 18,334 49.6 (49.0)	{ 21,289 54.2 (53.7)
Soap Factories	{ 42 1.7	{ 205 6.8	{ 399 4.5	{ 731 6.6	{ 1,927 8.0 (7.9)	{ 3,049 8.0 (7.9)	{ 1,884 4.8 (4.8)
Turpentine Farms and Distilleries	{ 184 7.5	{ 125 4.1	{ 330 3.7	{ 281 2.5 ^a	{ 8 ^a (367)	{ 8 ^a (435)	{ 8 ^a (307)
Other Chemical Factories..	{ 224 9.1	{ 581 19.2	{ 1,195 13.5	{ 1,191 10.3	{ 8,574 35.5 (35.0)	{ 11,762 30.9 (30.6)	{ 11,928 30.3 (30.1)
Total	{ 2,451 99.9	{ 3,023 100.1	{ 8,865 100.1	{ 11,059 100.0	{ 24,107 99.9 (367) (100.1)	{ 37,971 99.9 (435) (99.9)	{ 39,307 100.0 (307) (99.9)

* Figures in parentheses represent laborers; percentages in parentheses include laborers.

^a Less than .1 per cent.

.14 per cent of the total population, .36 per cent of the total of gainful workers, and 1.3 per cent of the Manufacturing and Mechanical category.

The census makes no clear distinction as to the grade of skill in the occupations represented in Chemical and Allied Industries from 1870 to 1900.¹⁴⁸ The ill-defined character of the

¹⁴⁸ See note 1, p. 135, above.

TABLE 163

WORKERS IN CHEMICAL AND ALLIED INDUSTRIES: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES, 1870-1930*

Base	1870	1880	1890	1900	1910	1920
Total population .....	.047	.073	.097	.121	{ .079 (.116)	.145 (.176)
All gainful workers, male and female.....	.143	.212	.268	.315	{ .191 (.280)	.366 (.443)
All in Manufacturing and Mechanical In- dustries .....	.518	.700	.863	1.011	{ .693 (1.016)	1.266 (1.588)
[Males of]						
All male gainful workers .....	.145	.230	.277	.339	{ .162 (.274)	.366 (.464)
All males in Manu- facturing and Mechi- cal Industries .....	.501	.740	.870	1.056	{ .6 (.947)	1.1 (1.379)
[Females of]						
All female gainful workers .....	.133	.114	.226	.208	{ .29 (.303)	.44 (.449)
All females in Manu- facturing and Me- chanical Industries .	.653	.437	.820	.772	{ 1.3 (1.346)	2.0 (1.990)
						2.1 (2.100)

Percentages in parentheses include laborers.

designations used prior to 1910 and their lack of comparability with those used from 1910 to 1930 is evident from a comparison of Table 160 with the following display:

Group	1870	1880	1890	1900
Turpentine Farmers and Laborers....	2,478	7,450	15,266*	24,735
Oil Refinery Operatives.....	1,747	....	....	....
Oil Mill and Refinery Operatives.....	....	3,929	....	....
Oil Works Employees.....	....	....	5,624	6,615
Chemical Works Employees.....	....	2,923	3,628	6,740
Patent-Medicine Makers	409	....	....	....
Perfumers	248	....	....	....
Starchmakers	229	1,385	746	762
Fertilizer Makers .....	....	....	732	1,310
Fertilizer Establishment Operatives....	316	1,383	....	....
Powder and Cartridge Makers.....	....	....	1,385	4,136
Powder Makers	575	....	....	....
Shot, Cartridge, and Fuse Makers....	186	....	....	....
Charcoal, Coke, and Lime Burners....	3,834	5,851	8,704	14,436
Candle, Soap, and Tallow Makers.....	1,942	2,923	3,450	4,020
Rubber Factory Operatives.....	3,886	6,350	16,162	21,866
Gas Works Employees.....	2,086	4,695	5,224	6,955

Estimated.

The 1910-1930 figures do not take into consideration the large number of workers other than operatives necessary to maintain the chemical industries. The census lists over two hundred thousand "laborers" alone in these industries in 1930, which is a number somewhat larger than that of the "operatives" group. These laborers, together with workers of this kind in all industries, are included in the laborer subgroup of the Administrative and Service group.

It may be noted that in 1920 the number of operatives in the chemical industries increased their proportion of both the total population and the total national labor force. The number of persons added to the group in chemical occupations from 1870 to 1880 was 18,953—over 100 per cent. The numerical increase from 1920 to 1930, when only operatives were included, was approximately the same, 20,972, but the percentage gain was only 13. However, during the decade 1870-1880, every subgroup of operatives within Chemical and Allied Industries showed substantial gains. In the census decade ending in 1930 these groups behaved quite differently. In fact the gain in the number of operatives in petroleum refineries, gas works, paint factories, and the miscellaneous chemical industries accounts for the entire gain made in this decade. In all other subgroups they either showed a decline or barely maintained their former positions.

When the large body of laborers attached to these industries is considered, a continuous increase for 1910-1930 is noted in both the total number of laborers and that of laborers and operatives combined (see Table 164).

The chemical industries expanded greatly during the war period from 1914 to 1920, but peacetime requirements were such that the labor force available increased slightly from 1920 to 1930. However, this was not true of such wartime industries as the manufacture of explosives. The purchasing power of consumers grew during the prosperous 1920-1930 decade, yet the labor force in some chemical industries such as rubber goods, for example, showed an actual decline. The amount of chemical production was affected not only by technological improvements which were taking place directly within these industries but also by changes in other industries which use chemical products. Mining, for example, underwent drastic changes; power drills and open-pit mining reduced the demand for explosives. Here is evidence of a technological change in

TABLE 164

OPERATIVES AND LABORERS IN CHEMICAL AND ALLIED.
INDUSTRIES, 1910-1930

Group	1910			1920			1930		
	Oper- atives	La- borers	Total	Oper- atives	La- borers	Total	Oper- atives	La- borers	Total
Charcoal and Coke Works	1,634	11,446	13,080	1,722	9,384	11,106	1,587	4,788	6,375
Explosives, Ammun- ition, and Fireworks Factories	5,263	4,277	9,540	7,379	8,467	15,846	5,904	5,047	10,951
Fertilizer Factories	635	9,847	10,482	1,407	12,943	14,350	1,538	18,248	19,786
Gas Works	5,732	16,549	22,281	9,462	18,845	28,307	13,896	28,897	42,793
Paint and Varnish Fac- tories	3,920	2,505	6,879	5,521	4,841	10,362	8,297	6,171	14,468
Petroleum Refineries ...	1,739	11,215	12,954	8,891	31,795	40,686	25,274	40,816	66,090
Rubber Factories	31,593	13,546	45,139	86,204	51,467	137,671	80,835	29,123	109,958
Other Chemical Facto- ries	16,444	21,225	37,669	29,746	43,323	73,069	84,742	38,200	122,942
Soap Factories	4,443	3,433	7,876	6,238	4,715	11,003	5,289	4,799	10,088
Turpentine Farms and Distilleries	1,449	33,962	35,411	1,138	25,830	26,968	1,368	37,620	38,988
Total	72,852	128,459	201,311	157,758	211,610	369,368	178,730	213,699	392,429

one industry altering the labor force in a different industry which is partly dependent upon it.

On the other hand, during the decade 1920-1930 impetus was given certain industries in the Chemical Industries group by a demand on the part of the consuming public for certain new products and by the discovery of great deposits of raw material. At about the same time that the Texas and California oil fields were discovered and developed the low-priced automobile and modern methods of part-payment financing were being offered. These automobiles met a public demand and created an enlarged requirement for petroleum products. New methods of refining, such as the cracking process, were perfected, and the over-all increase in the petroleum industry was so great that despite all labor-saving changes many more workers were used.

The development of the Chemical and Allied Industries group as compared with the growth in the total population and of the total of gainful workers is shown in Table 165.

It is apparent from the table that the Chemical group expanded during the sixty years under review—4.1 times the rate of growth of the total population, and 3.9 times that of the total of gainful workers. The percentage increase for the Chemical group for 1920 looms large because of a substantial

TABLE 165

PERCENTAGE CHANGE IN WORKERS IN CHEMICAL AND ALLIED INDUSTRIES
COMPARED WITH THAT OF THE TOTAL POPULATION AND OF THE
TOTAL OF GAINFULLY EMPLOYED, 1870-1930

Census	Total Population	Total of Gainfully Employed	Chemical and Allied Industries*		
			Total	Males	Females
1870.....					
1880.....	+ 30.1	+ 39.1	+105.7	+118.7	+ 23.5
1890.....	+ 24.8	+ 30.7	+ 65.1	+ 53.7	+ 192.8
1900.....	+ 21.4	+ 27.9	+ 50.3	+ 54.7	+ 24.7
1910.....	+ 21.0	+ 31.3	- 20.4	- 39.5	+ 118.0
1920.....	+ 14.9	+ 9.0	+116.5	+145.7	+ 57.5
1930.....	+ 16.1	+ 17.3	+ 13.3	+ 16.4	+ 3.5
1930 over 1870	+218.4	+290.5	+896.5	+800.4	+1,503.7

* Refers to operatives only, 1910-1930.

decline in 1910 which reflected the effect of census-classification changes. If laborers are added in an attempt to make the series comparable, the sharp decline in 1910 disappears and a marked increase is recorded.

Sex Composition of the Chemical Group

The relative importance of the sexes and the manner in which they have been added to the labor force in the Chemical group may be noted from the following percentage display:

Census	Male ^a	Female ^a
1870	86.3	13.7
1880	91.8	8.2
1890	85.4	14.6
1900	87.9	12.1
1910	77.1	22.9
1920	79.1	20.9
1930	81.7	18.3

^a Refers to operatives only, 1910-1930.

Chemical occupations are largely confined to males. By 1930, 18 per cent of all such workers were females. However, the 1910-1930 proportion of female workers in chemical industries did not alter greatly, but suffered a slight decrease, from 23 to 18 per cent. In whole numbers, however, both males and females increased, males making the greater gains.

Industrial Trends in Certain Chemical Industries

Some idea of the changes which are taking place in the chemical industries may be gained from the *Census of Manufactures* figures on chemical and allied products from 1919 to 1929, presented in Table 166. All workers are included.

TABLE 166

COMPARISON OF AVERAGE NUMBER OF WAGE EARNERS, VALUE OF PRODUCTS, AND NUMBER OF ESTABLISHMENTS IN CHEMICAL AND ALLIED INDUSTRIES, 1919-1929*

	1919	1929	Percentage Change
Average number of wage earners for the year.....	329,053	280,868	-14.6
Value of products.....	\$3,803,752,737	\$3,759,404,640	-1.2
Number of establishments...	10,732	8,278	-22.9

* *Census of Manufactures, 1929, I, 212.* Figures for 1935 are not precisely comparable. See *Census of Manufactures, 1935, p. 604.*

It should be remembered that the 1919 price levels of chemical products were considerably above those of 1929, hence fewer units of products could be bought with the same amount of money at that time than at the later date.¹⁴⁹ This would indicate an actually larger production of chemical goods in 1929 than the figures on value of products show. The 1919 figures record the expanded production occurring just at the close of the World War, whereas the figures for 1929 record a peak peacetime industrial prosperity. The value of production per worker employed in 1919 was \$11,560, while ten years later it was \$13,385, a gain of \$1,825 per worker. In other words, a labor force 15 per cent smaller in 1929 than in 1919 produced in 23 per cent fewer plants goods valued approximately the same as in the earlier period.¹⁵⁰

Because of the lack of adequate data on the volume of physical output of chemical plants, various figures are used as a roundabout way of arriving at an approximation of the increased productivity per worker engaged in the chemical industry. If statistical correction is made for the difference in 1919 and 1929 price levels, the value of 1929 chemical products

¹⁴⁹ Theodore J. Kreps, *On the Chemical Phase of the Industrial Revolution, Economics, Sociology, and the Modern World*, Harvard University Press, 1935, p. 154. In terms of 1910-1914 dollars, the index stood at 193 in 1919 and at 116 in 1929.

¹⁵⁰ For the period 1929-1936, it appears from Table 54, above, that production of "chemicals" increased 6 per cent, employment 13.3 per cent, and output per man-hour 18.2 per cent.

advances to \$6,252,000,000 and the productivity per worker employed to \$22,270, or an increase of 66.2 per cent in the ten years.

Professor Theodore J. Kreps in his authoritative study of the chemical industry gives careful treatment to the use of labor. His selection of chemical industries is based upon a grouping of industries in which chemical transformations are basic and chemical engineering processes are preponderant and controlled by trained engineers. This grouping is therefore not identical with the census classifications for these occupations. Nevertheless his work does present certain figures which are of importance in this discussion.¹⁵¹ The pertinent data are assembled in Table 167. The figures corroborate those already presented.

TABLE 167
GROWTH IN CHEMICAL INDUSTRIES, 1869-1929*

Year	Establishments		Wage Earners		Value of Products	
	Number	Percentage Change	Number	Percentage Change	In 1910-14 Dollars (in Thousands)	Percentage Change
1869	3,670	.....	134,000	.....	227,000	.....
1879	4,547	+ 23.9	192,000	+ 43.3	604,000	+ 210.1
1889	8,392	+ 84.6	269,000	+ 40.1	1,043,000	+ 72.7
1899	11,354	+ 35.3	445,000	+ 65.4	2,104,000	+ 101.7
1909	16,201	+ 42.7	695,000	+ 56.2	4,387,000	+ 108.5
1919	16,237	+ 0.2	1,110,000	+ 61.2	6,673,000	+ 52.3
1929	12,830	- 21.0	1,002,000	- 9.7	11,103,000	+ 66.4
1929 over 1869..	9,160	+249.6	868,000	+647.8	10,876,000	+4,791.2

* After Kreps.

It is interesting to note that in sixty years the percentage increase in number of plants was 249, in average number of wage earners employed 648, and in value of products 4,791. Professor Kreps summarizes¹⁵² as follows:

Other facts which appear are, first, the continued growth, though at a diminishing rate, of large-scale production in the chemical industries, whether it be measured in terms of the number of wage earners per establishment or of value added by manufacture per establishment, and, second, the diminishing importance of the wage bill in chemical manufacturing. That the value added by manufacture should increase from 2.7 times the wages paid to 3.8 times the labor expense is indicative not

¹⁵¹ Kreps, *op. cit.*, pp. 154-55.

¹⁵² Kreps, *op. cit.*, p. 155.

only of the growth of mechanization in the chemical industries but also of the attendant increases in fixed charges, research outlays, and other items of overhead.

In investigating occupational displacement, it is always necessary to consider the probability that workers displaced from one industry are somewhat compensated for by additions to the labor force elsewhere. Exactly how many workers displaced from the chemical industry are relocated in other industries is not known. But it may be pointed out that, although additions are made in research and other personnel, they are relatively few in number and do not alter the trend toward the over-all displacement of workers.

The number of chemists, metallurgists, and assayers in 1930 was 47,068, or .1 per cent of the gainfully employed. However, less than half of this group, 19,323, were engaged in the chemical and allied industries, of which they comprised only 9.7 per cent.¹⁵³

It is probable that commercial output of chemical plants is increased more by providing a few competent research specialists with elaborate equipment than by using a great many research workers and little equipment. It is also true that commercial production of chemicals is governed not so much by the capacity of the plant, equipment, and man-power, as by market conditions affecting the amount of product which can be sold profitably. These conditions influence not only labor in chemical plants but research personnel as well.

Charcoal and Coke Works

In 1930, this group constituted only a fractional part of the labor force engaged as operatives in all chemical pursuits (.9 per cent), whereas in 1870 it made up 21.4 per cent of the Chemical group. The maximum number in the Charcoal and Coke group was reached in 1900—14,436 workers, representing .01 per cent of the total population, .05 of the gainful workers, and 15.8 of all operatives in chemical and allied industries. The numbers engaged in this group increased from 1870 to 1900; but, even with the addition of laborers, a decline is recorded thereafter. In 1930, there were only 1,587 charcoal and coke operatives listed, the smallest number in any census since the turn of the century.¹⁵⁴ Considering the diminished need for

¹⁵³ See page 544, above, for a fuller discussion of chemists.

¹⁵⁴ For over-all changes from 1929 to 1936, see Table 54, above.

charcoal and coke in the modern industrial world and the changes still taking place, there is no likelihood that there will be any enlarged demand for such workers; in fact, conditions point to a further reduction in their number.

Explosives, Ammunition, and Fireworks Factories

In 1930 this group totaled 5,904 operatives, being 3.3 per cent of all operatives in chemical and allied industries. The maximum was reached during the war period, the census of 1920 recording 7,379 explosives and ammunition factory operatives. The 1930 labor force was about equal to that of 1910. In comparison with the total population and the total of gainfully employed, the maximum number of operatives in these industries was reached in 1920, when these workers comprised .007 per cent of the former and .018 of the latter.

The explosives and ammunition industry has been and is being subjected to much mechanization and despite the preparedness program and wartime orders which have created a sudden demand for munitions,¹⁵⁵ there is little prospect of a great increase in the number of operatives. In view of the changes in mining and other activities requiring explosives, there is some possibility of a lessened peacetime demand, which may be reflected in a further reduction in the number of persons listed in this group. The trend of female workers is also of importance. In each successive decade an increasing number of women have been placed in the explosives and ammunition industry until in 1930 they were half of all operatives.

Table 168 gives statistics for the explosives industry. The maximum number of establishments was reached in 1919; by 1929, then, there had been a decided decline. The peak employment was also in 1919. Average payments per worker failed to increase comparably with the value added by the manufacture of explosives in 1929 as compared with 1899.

Table 169 gives data on the ammunition industry. The number of establishments reached a peak in 1919 and declined 50 per cent by 1929. The number of salaried workers dropped 84 per cent, while the number of wage earners declined 68 per cent. The value added by manufacture, however, dropped only 52 per cent. And for the period, 1899-1929, the increase in the value added by manufacture per worker greatly exceeded the increase in payments per worker.

¹⁵⁵ Written in July 1940.

TABLE 168

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, PAYMENTS PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE EXPLOSIVES INDUSTRY, 1899-1929*

		1909	1919	1929	Change, 1929 over
Number of establishments	97	86	118	95	- 2
Percentage change .....	....	-11.3	+ 37.2	- 19.5	- 2.1
Salaried officers and employees	768	763	6,152	791	23
Percentage change .....	....	- 0.7	+706.3	- 87.1	+ 3.0
Wage earners	4,502	6,274	9,249	5,614	1,112
Percentage change .....	....	+39.4	+ 47.4	- 39.3	+ 24.7
Average payments per worker..	\$ 626	\$ 773	\$1,672	\$1,673	\$1,047
Percentage change .....	....	+23.5	+116.3		+167.4
Value added by manufacture per worker	\$1,288	\$2,462	\$3,021	\$6,365	\$5,077
Percentage change .....	....	+91.1	+ 22.7	+110.7	+393.8

* *Census of Manufactures, 1929, II, 682-83; Census of Manufactures, 1909, X, 567.* Per-worker figures computed. By 1937 the number of establishments had declined to 77, that of salaried officers to 773, and that of wage earners to 5,406 (*Census of Manufactures, 1937, "Explosives," p. 3*).

TABLE 169

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, PAYMENTS PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE AMMUNITION AND RELATED-PRODUCTS INDUSTRY*

		1919	Changes, 1929 over 1899		
Number of establishments	33	39	42	21	- 12
Percentage change .....	....	+18.2	+ 7.7	-50.0	- 36.4
Salaried officers and employees ...	204 ^a		4,645	739	535
Percentage change .....	....			-84.1	+262.2
Wage earners	5,231	8,713	22,816	7,223	1,992
Percentage change .....	....	+66.6	+161.9	-68.3	+ 38.2
Average payments per worker	\$ 490	\$ 517	\$1,033	\$1,145	\$ 655
Percentage change .....	....	+ 5.5	+ 99.8	+10.8	+133.9
Value added by manufacturer per worker	\$1,068	\$1,217	\$2,189	\$3,317	\$2,249
Percentage change .....	....	+13.9	+ 79.8	+51.5	+210.3

* *Census of Manufactures, 1929, II, 632; 1919, X, 403.* For "ammunition" figures since 1929, see *Census of Manufactures, 1935, p. 607*, and 1937, "Ammunition," p. 1.

^a Includes proprietors and firm members.

^b Figures not available.

Fertilizer Factories

In 1930 the number of operatives in fertilizer factories was only 1,538. This number constituted .9 per cent of all operatives in chemical and allied industries, .001 per cent of the total population, .003 per cent of the gainfully employed, .01 per cent of the Mechanical and Manufacturing category. The number of operatives in fertilizer factories was slightly larger in 1930 than it was in 1920. These workers have always formed a very minor portion of the working population. They, too, are subject to the force of mechanization, and despite an increasing production of commercial fertilizers prior to 1930 there is little likelihood that the future offers any possibility of altering these conditions. These occupations are followed almost wholly by men.¹⁵⁶

Petroleum Refineries

The manufacture of petroleum products, oils and gasolines and their by-products, received its greatest impetus in the years following the World War. In 1930, these refining industries had a labor force of 25,274 operatives, all but 493 of whom were men. At this peak of development, semiskilled refinery operatives comprised .02 per cent of the total population, .05 per cent of the gainfully employed, .18 per cent of the Manufacturing and Mechanical category, and 14 per cent of the operatives in all chemical pursuits. Most of the gain made in the ten years from 1920 to 1930 occurred despite technological advances which experts record as being of startling significance in petroleum refining. This reflects the changed demand for refined products based on crude oil.

The production of petroleum¹⁵⁷ has been as follows:

Year	Million Barrels	Percentage Increase
1870	5.3	.....
1880	26.3	396.2
1890	45.8	74.1
1900	63.6	38.9
1910	209.6	229.5
1920	442.9	111.3
1930 (1929)	1,007.3	127.4

¹⁵⁶ See Table 54, above.

¹⁵⁷ Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, 1934, pp. 290-91.

However, this industry does not use a great quantity of labor per unit of production. Being semiautomatic, enormous increases in production can take place without corresponding increases in the labor used. Granted that the nation's consumption of refined-oil products has not reached its maximum, even though it should increase several fold over present levels and the technological processes in refining undergo no alterations to reduce labor needs,¹⁵⁸ the refining occupations could not absorb any appreciable percentage of the available labor supply. Prior to 1930 the number of workers in these occupations was rapidly increasing. From 1929 to 1936 employment was reduced 2.7 per cent, while output per man had increased 58 per cent (see Table 54).¹⁵⁹

Gas Works

This group includes semiskilled operatives in gas works producing and distributing gas for both heating and lighting. The census states that workers in natural and manufactured gas cannot be clearly distinguished. In 1930 the group of operatives in gas works numbered almost 14,000 and constituted .01 per cent of the population, .028 per cent of the gainfully employed, .10 per cent of the Manufacturing and Mechanical category, and 7.7 per cent of the Chemical group. The number of operatives in gas works has increased in each decade since 1870 except that ending in 1910. In addition to operatives in gas works, the 1930 census lists almost 29,000 laborers in such work.

The use of gas has increased enormously. In 1904, 112,549,979 million cubic feet of gas was manufactured, employing an average of 30,566 persons. In 1929 production was 408,401,395 million cubic feet, using an average of 43,065 wage earners. These figures show an increase of 263 per cent in the production of manufactured gas in the same period of time which witnessed an increase of only 40 per cent in the number of wage earners.¹⁶⁰

While there is every reason to expect that the use of gas

¹⁵⁸ For anticipations of revolutionary consequences to follow from the new Houdry process in petroleum refining and their possible bearing upon the uses of gasoline, see *Fortune*, February 1939.

¹⁵⁹ A discussion of the oil industry of Texas from drilling to distribution is put out in mimeographed form by the NYA of Texas with the title *Employment Opportunities in the Oil Industry in Texas*, Austin, Texas, September 1, 1938.

¹⁶⁰ *Census of Manufactures*, 1919, X, 706-12; 1929, II, 751-54. Late figures are not comparable. See *Census of Manufacturers*, 1935 and 1937. In 1935 production of gas fell from the figure given for 1929 to 312,224,152 million cubic feet.

will continue to become more extensive, there is also much evidence to show that as technological changes occur fewer workers are required per unit of production and distribution. The total regular labor force engaged in or likely to be added to the gas industry is too small to be of numerical significance in the total of the labor force of the nation.

Paint and Varnish Factories

The census made no separate returns for this industry prior to 1910. In 1930 operatives in paint and varnish factories totaled 8,297. This subgroup comprised .007 per cent of the total population, .017 per cent of the total of gainfully employed, .061 of the workers in manufacturing and mechanical pursuits, and 4.6 per cent of those in the Chemical and Allied Industries group. It doubled in numbers in the last two censuses.

Modern industry has found extensive use for paints and varnishes, not only in building construction but in a wide variety of manufacturing, not the least of which is automobile construction. In Table 170 certain basic facts are assembled, showing production and workers used in that production.

TABLE 170
PRODUCTION OF MIXED PAINTS AND VARNISHES AND WORKERS USED
IN THAT PRODUCTION, 1914-1929*

	1914	1923	1929	Increase, 1929 over 1914
Paints and Varnishes,				
1,000 gallons	77,111 ^a	151,677 ^b	233,039 ^c	155,928
Percentage increase .....	....	96.7	53.6	202.2
Wage earners employed.....	16,083 ^d	22,818 ^d	29,211 ^d	13,128
Percentage increase .....	....	41.9	28.1	81.6

* The average number of wage earners reported in 1937 was 31,164 (*Census of Manufactures, 1937*, "Paints and Varnishes," p. 9).

^a *Abstract of the Census of Manufactures, 1914*, p. 193.

^b *Census of Manufactures, 1925*, pp. 813-14.

^c *Census of Manufactures, 1931*, pp. 631-32 (separate items added).

^d *Census of Manufactures, 1929*, II, 718.

This table shows more than double the rate of production of paints and varnishes in comparison with workers added in the fifteen-year period. This rapidly expanding industry has been able to meet the demands for its products by installing labor-saving machinery and processes which have enabled it to increase per-man productivity enormously. In 1914 the annual production per worker was 4,800 gallons of paint and varnish. By 1929 the production was 7,890 gallons, or a gain of 64 per cent. It is probable that the demand for paints and

varnishes will continue, but in view of the increased technology, which has so greatly increased the output of labor, only a continually growing demand will maintain the employment of more workers. As more technological changes are introduced, the labor force used in the manufacture of paints and varnishes faces the possibility of reduction in number. In fact, somewhat fewer workers were added in the six years from 1923 to 1929 than in the decade 1914-1923, despite the greatly increased output of paints and varnishes. Between 1929 and 1936 employment decreased 1 per cent, while output per man-hour increased 21.1 per cent (Table 54, above).

Rubber Factories

Operatives in rubber factories numbered 80,835 in 1930, and constituted .06 per cent of the total population, .16 of the gainfully employed, .59 of all workers listed in the Manufacturing and Mechanical category, and 45 per cent of the operatives in the Chemical group. This group showed a numerical increase from 1910 to 1930, and likewise increases in its percentage of total population, of all gainful workers, of all in the Manufacturing and Mechanical category, and of all in the Chemical group. The reverse is true of both the number of workers and the percentages recorded from 1920 to 1930. This probably indicates a war-period labor demand which was not permanent. Despite the prosperous economic conditions prevailing in the ten years from 1920 to 1930, a drop occurred in the number of operatives in rubber factories. The perfection of automatic and semiautomatic machinery was also taking its toll of workers during this time.

The importation of rubber is a basic measure of the growth of rubber products. The series¹⁰¹ is as follows:

Year	Rubber Imports (Million Pounds)	Percentage Change	Rubber Factory Operatives	Percentage Change
1870.....	7.5	....	3,886	....
1880.....	18.0	+ 140.0	6,350	+ 63.4
1890.....	33.9	+ 88.3	16,162	+ 154.5
1900.....	45.5	+ 34.2	21,866	+ 35.3
1919.....	84.0	+ 84.6	31,593	+ 44.5
1920.....	557.2	+ 563.3	86,204	+ 172.9
1929.....	1,181.2	+ 112.0	80,835	- 6.2
1870 over 1929	1,173.7	+15,649.3	76,949	+1,980.2

¹⁰¹ Arthur F. Burns, *Production Trends in the United States since 1870*, National Bureau of Economic Research, New York, 1934, pp. 294-95. Figures on operatives are taken from the census, hence are for "available" workers, only a portion of whom are employed. The figure for operatives assigned to 1929 is for 1930.

The enormously increasing productivity of rubber factory workers is suggested by these figures, noticeably since 1910, when greatly expanded rubber importations were required to meet the demand for rubber tires and other goods.

It is interesting to note that a 112 per cent increase in raw rubber imports in the ten years preceding 1929, which were manufactured into articles for sale on the largest consumers' market the United States has ever had, was achieved with an actual decline of 6.2 per cent in the number of available operatives. This would seem to indicate that only a very much increased demand for rubber products, such as occurred during wartime, would require a larger labor force in this industry.¹⁶² Even then, the introduction of more labor-saving machinery, which occurs whenever the total wage bill is greatly increased, would tend to lessen the addition of more rubber factory workers.

The introduction of machinery has caused a new alignment of the sexes employed in these factories. The loss in the Rubber Factories group in 1930, as compared with 1920, was due entirely to the displacement of males. This group showed an actual increase in the number of females during that time, and at the last census females made up 26 per cent of all rubber factory operatives.¹⁶³

Soap Factories

The number of semiskilled machine operatives listed as workers in soap factories totaled 5,289 in 1930, or .004 per cent of the population, .011 per cent of the gainfully employed, .039 per cent of the Manufacturing and Mechanical category, and 2.9 per cent of the Chemical group. Notwithstanding the change which took place in census classification from 1900 to 1910, this subgroup exhibited a slight but steady numerical increase in successive decades from 1870 to 1920. However, a 1920-1930 decline was recorded. How the number of soap factory workers has compared with the amount of soap production may be seen in Table 171.

There was a notable decline in the number of soap factories in each decade after 1909, resulting in a reduction of 35 per cent by 1929. This was caused by the failure of small local factories, or their merger into large manufacturing establishments hav-

¹⁶² See the figures of Table 54, above.

¹⁶³ The NYA of Ohio has a mimeographed publication, *The Rubber Industry of Ohio*, by S. N. Wilson, July 1933.

TABLE 171

COMPARISON OF NUMBER OF ESTABLISHMENTS, WAGE EARNERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE SOAP INDUSTRY, 1909-1929*

1919

Number of establishments	420	348	282	— 138
Percentage change .....	....	— 20.2	— 19.0	— 35.3
Number of wage earners	12,999	20,436	14,363	1,364
Percentage change .....	....	+ 51.0	— 29.7	+ 6.1
Wages per worker	\$ 479	\$1,039	\$1,322	\$ 843
Percentage change .....	....	+117.0	+ 27.2	+176.0
Value added by manufacture per worker	\$3,013	\$3,828	\$9,041	\$6,028
Percentage change .....	....	+ 27.0	+136.1	+200.0

* *Census of Manufactures, 1929, II, 734.* Per-worker figures computed. In 1937 the number of establishments was 232 and the average number of wage earners was 14,008 (*Census of Manufactures, 1937, "Soap," p. 18*).

ing national outlets and conducting their business with widespread advertising of their products. The maximum number of wage earners was recorded in 1919, for even during the most prosperous buying period in our domestic economy from 1919 to 1929 the number of workers in soap factories decreased 29 per cent.

For the twenty-year period, 1909-1929, the number of wage earners employed in soap factories increased only 6 per cent, while the value added by manufacture increased 223 per cent. Technological changes greatly increased per-worker productivity in these factories. The value added by manufacture per worker employed in 1909 was approximately \$3,000, but by 1929 this had advanced to about \$9,000. Under such circumstances, only an enormously increased consumption of soap could maintain the labor force employed. From 1919 to 1929 the number of workers in soap factories had fallen off 29 per cent. Assuming that all soap factory workers are engaged in the production of hard soap, it is possible to obtain a measure of the increased per-worker productivity in this industry.¹⁶⁴ The average soap worker employed in 1919 produced 89,000 pounds of hard soap; the average worker employed in 1929 produced 156,700 pounds of such soap, or a gain in ten years of 74 per cent.

¹⁶⁴ Separate figures on the production of hard and of soft soaps and the number of workers engaged in each are not available. However, hard soap is the predominant form of manufacture and employs almost all workers. Regardless of this confusion, the illustration has validity because soft-soap workers are included in both sets of figures.

The decreased demand for soap factory workers affects both machine operatives and unskilled laborers. That it will continue for some time is highly probable in view of rapidly increasing technology, the mergers into larger, better-equipped, and more heavily financed plants, and the continued lack of purchasing power among consumers as compared with that of the peak year 1929.

Turpentine Farms and Distilleries

Turpentine farmers and distillers totaled only 1,368 in 1930. Owing to the fact that sometimes such workers may have been listed by census enumerators as farmers, at other times as turpentine farmers, the figures in this series of tables are somewhat dubious. Also, they do not include turpentine farm and distillery laborers, which make up the majority of workers in the industry, and which have been grouped with other common and unclassified industrial labor.

TABLE 172

NUMBER OF ESTABLISHMENTS, NUMBER OF WORKERS, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE TURPENTINE INDUSTRY, 1899-1929*

	1899	1909	1919		Change, 1929 over 1899
Number of establishments ...	1,503	1,585	1,191	1,183	- 320
Percentage change .....	....	+ 5.5	- 24.9	- 0.7	-21.3
Average number of wage earners	41,864	39,511	28,067	40,157	1,707
Percentage change		- 5.6	- 29.0	+43.1	- 4.1
Wages per worker	\$200	\$237	\$ 605	\$375	\$175
Percentage change .....	....	+18.5	+155.2	-38.0	+87.5
Value added by manufacture per worker	\$338	\$516	\$1,394	\$647	\$309
Percentage change		+52.6	+170.3	-53.6	+91.4

* *Census of Manufactures, 1929*; II, 526-27. Per-worker figures computed. By 1935 the number of establishments had declined to 895 and that of wage earners to 27,248 (including workers employed in the woods—excluded in 1937, when the figure reported was 1,506). *Census of Manufactures, 1935*, p. 514, and 1937, "Turpentine," p. 14.

The number of establishments making turpentine decreased 21 per cent from 1899 to 1929. The average number of wage earners employed has decreased slightly. Wages paid per worker in 1929 tended to approximate the value added by manufacture per worker, indicating that wage earners in this industry were obtaining their share of the recorded increase.

Other Chemical Factories (Tables 173 to 177)

In 1930 the number of semiskilled machine operatives listed in this group totaled 34,742, which was .028 per cent of the population, .071 per cent of the gainfully employed, .25 per cent of the Manufacturing and Mechanical category, and 19 per cent of the Chemical group. The labor demands of these chemical factories have grown in each successive census decade. This is a miscellaneous group, and it should be borne in mind that fluctuations of numbers recorded and of their percentages of the groups studied are largely due to census classifications. However, the 1910 figures for both operatives and laborers are somewhat smaller than those for 1930.

These factories produce a wide variety of materials such as baking powder, yeast and other compounds, bluing, bone black, carbon black, and lampblack, cleaning and polishing preparations, perfumes and cosmetics, druggists' preparations, drug grinding, compressed and liquefied gases, glue and gelatin, ink, oil cake, and dye stuffs. Individual plants engaged in these operations are not great users of labor in comparison with the mass-production industries. Data concerning the production and labor force in some of these miscellaneous industries are given in Tables 173 to 176.

TABLE 173

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, SALARIES AND WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN DRUGGISTS' PREPARATIONS INDUSTRY, 1899-1929*

	1909	1919	1929	Change, 1929 over 1899
Number of establishments	173	375	429	256
Percentage change		+116.8	+39.7	- 18.1
Salaried officers and employees	1,982	4,693	6,718	3,930
Percentage change		+136.8	+43.1	- 41.5
Wage earners	5,658	9,490	15,568	10,688
Percentage change		+ 67.7	+64.0	- 31.3
Wage and salary per worker . .	\$ 554	\$ 708	\$1,143	\$1,633
Percentage change		+ 27.8	+61.5	+ 42.8
Value added by manufacture per worker	\$1,558	\$1,842	\$2,669	\$5,540
Percentage change		+ 18.2	+44.9	+107.5

* *Census of Manufactures, 1929, II, 668-69; 1919, X, 669.* Figures per worker computed. This classification has been altered since 1929. (See *Census of Manufactures, 1935 and 1937.*)

TABLE 174

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, PAYMENTS PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE COSMETICS AND OTHER TOILET-PREPARATIONS INDUSTRY, 1899-1929*

			1919		Increase, 1929 over
Number of establishments	262	429		815	553
Percentage increase		63.7	32.6	43.2	211.1
Salaried officers and employees		1,484	3,668	6,120	5,312
Percentage increase		83.7	147.2	66.8	657.4
Wage earners	1,764	2,375	5,405	13,109	1,345
Percentage increase		34.6	127.6	142.5	643.1
Payments per earner	\$ 516	\$ 685	\$1,148	\$1,553	\$1,037
Percentage increase		24.2	67.7	35.2	201.0
Value added by manufacture					
per worker	\$1,536	\$2,222	\$3,690	\$7,030	\$5,494
Percentage increase		44.6	66.0	90.5	357.7

* *Census of Manufactures, 1929*, II, 668-71; 1919, X, 669. Per-worker figures computed. By 1937 the number of establishments had declined to 478, and the average number of wage earners to 10,158 (*Census of Manufactures, 1937*, "Perfumes, Cosmetics, etc.," p. 15).

TABLE 175

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, SALARIES AND WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE GLUE AND GELATIN INDUSTRY, 1899-1929*

		1909	1919	1929	Change, 1929 over
Number of establishments	61	65	62	74	13
Percentage change		+ 6.6	- 4.6	+19.3	+ 21.3
Salaried officers and employees	159	530	618	545	386
Percentage change		+233.3	+ 16.6	-11.8	+242.8
Wage earners	1,618	3,265	4,264	2,993	1,375
Percentage change		+101.8	+ 30.6	-29.8	+ 85.0
Salaries paid per salaried					
workers	\$1,207	\$1,409	\$2,232	\$2,044	\$1,837
Percentage change		+ 16.8	+ 58.3	+36.4	+152.2
Wages paid per wage worker...	\$ 423	\$ 481	\$1,120	\$1,414	\$ 991
Percentage change		+ 13.7	+132.8	+26.3	+234.2
Value added by manufacture					
per worker	\$ 913	\$1,632	\$2,634	\$3,814	\$2,901
Percentage change		+ 78.8	+ 61.4	+44.8	+317.9

* *Census of Manufactures, 1929*, II, 694-95; 1909, X, 511. Per-worker figures computed. The number of establishments in 1937 was 75 and that of wage earners 3,547 (*Census of Manufactures, 1937*, "Glue and Gelatine," p. 1).

TABLE 176

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, SALARIES PAID PER WORKER, WAGES PAID PER WORKER, AND VALUE ADDED BY MANUFACTURE PER WORKER IN THE BONE BLACK, CARBON BLACK, AND LAMPBLACK INDUSTRY, 1899-1929*

	1899	1909	1919	1929	Change, 1929 over 1899
Number of establishments	15	27	35	77	62
Percentage change		+ 80.0	+ 29.6	+120.0	413.3
Salaried officers and employees		67	121	222	201
Percentage change		+219.0	+ 80.6	+ 83.5	+ 957.1
Wage earners		228	675	1,915	1,830
Percentage change		+168.2	+196.1	+183.7	+2,152.9
Salaries paid per salaried worker	\$ 1,143	\$1,164	\$ 2,578	\$ 3,135	\$ 1,992
Percentage change		+ 1.8	+121.3	+ 21.6	+ 174.1
Value added by manufacture per salaried worker	\$12,090	\$9,690	\$27,580	\$49,900	\$37,810
Percentage change		- 19.4	+184.7	+ 81.0	+ 312.9
Wages paid per wage worker...	\$ 541	\$ 654	\$ 1,197	\$ 1,348	\$ 807
Percentage change		+ 20.8	+ 83.1	+ 12.6	+ 149.2
Value added by manufacture per wage worker	\$ 2,989	\$2,846	\$ 4,945	\$ 5,787	\$ 2,798
Percentage change		- 4.8	+ 73.8	+ 11.7	+ 93.6

* *Census of Manufactures, 1909, X, 553; 1919, X, 753; 1929, II, 642.* Per-worker figures computed. In 1937 the number of establishments was 62 and that of wage earners 2,190 (*Census of Manufactures, 1937, "Bone Black, etc.," p. 22*).

Table 173 shows that the peak number of manufacturing establishments making druggists' preparations was reached in 1919. The industry suffered a marked decline in number of establishments, workers, and salaried officers during the prosperous period ending in 1929. While salaries and wages per worker increased at about the same rate during this period, the value added by manufacture per salaried worker and per wage worker both increased at a rate over twice as great. During the thirty-year period under scrutiny, payments per employed person failed to make comparable gains with the increase in the value added by manufacture.

A very important branch of the chemical industry is the manufacture of cosmetics. Table 174 gives the essential data for the period 1899-1929. The number of establishments increased rapidly, the peak being in 1929. The number of salaried workers and wage earners also increased. But in comparison with the value added by manufacture neither

TABLE 177

COMPARISON OF NUMBER OF ESTABLISHMENTS, NUMBER OF SALARIED EMPLOYEES, NUMBER OF WAGE EARNERS, SALARIES PAID, WAGES PAID, VALUE OF PRODUCTS, AND VALUE ADDED BY MANUFACTURE IN THE BLACKING, STAINS, AND DRESSING INDUSTRY, 1899-1929*

		1909	1919		Change, 1929 over 1899
Number of establishments	121	201	220	170	49
Percentage change		+66.1	+ 9.5	- 22.7	+ 40.5
Salaried officers and employees			1,131	766	
Percentage change				- 32.3	
Wage earners	1,250	1,438	2,455	1,617	367
Percentage change		+15.0	+70.7	- 34.1	+ 29.4
Salaries per salaried worker ...			\$2,315	\$ 2,644	
Percentage change				+ 14.2	
Value added by manufacture per salaried worker			\$9,950	\$21,325	
Percentage change				+114.3	
Wages per wage worker		\$ 464	\$ 859	\$ 1,210	\$ 871
Percentage change		+36.8	+85.1	+ 40.9	+257.0
Value added by manufacture per wage worker	\$1,855	\$2,889	\$4,582	\$10,090	\$8,235
Percentage change		+55.7	+58.6	+120.3	+444.0

* *Census of Manufactures, 1929, II, 637.* Per-worker figures computed. The number of establishments in 1937 was 147 and that of wage earners 1,536 (*Census of Manufactures, 1937, "Blacking, Stains, etc.," p. 1*).

* Not available.

salaried personnel nor wage workers obtained a proportionate increase, indicating that other overhead costs and capital claimants received a relatively greater share of the increased value added by the manufacture of the products.

Table 175 gives comparable data for the glue and gelatin industry. The number of establishments in 1929 was the greatest in the industry's history, but the number of salaried and wage workers declined considerably from their peak in 1919. For the period 1899-1929 neither the increase in salaries nor in wages paid per worker kept pace with the increase in the value added by manufacture per worker.

Table 176 gives the figures for the bone black, carbon black, and lampblack industries for the period 1899-1929. The number of establishments engaged in making these products increased, as did both the number of salaried workers and wage earners. The increase in salaries per worker did not keep pace with the value added by manufacture per worker, but wages paid per worker exceeded materially that value.

Table 177 gives pertinent figures for the blacking, stains, and dressing industries. The maximum number of establishments engaged in manufacturing these products was reached in 1919, the decline recorded in 1929 being 23 per cent. The number of salaried and wage workers likewise declined, but the value added by manufacture per worker of these products increased appreciably from 1919 to 1929. Here is an indication of the important contribution made by chemical discoveries and improved technology in the industry.

N. MISCELLANEOUS GROUP

General Characteristics (Tables 178 to 182)

It is manifestly impossible, in dealing with the whole range of manufacturing, to segregate all occupations into specific groups for enumeration and description. Some are of relatively little numerical significance in the total gainfully employed; others have not been in existence long enough to permit a description of their trends. The careful manner in which the census has segregated so many occupational groups for scrutiny is indicated by the fact that in 1930 the Miscellaneous group included only 5.3 per cent of all workers in the Manufacturing and Mechanical group. The persons represented in this group are workers in bone and ivory and in hair goods, piano and organ tuners, musical-instrument makers not otherwise specified, ship- and boatbuilders not otherwise specified, general apprentices, well borers, whitewashers, turpentine distillers, cotton ginnerers, employees in electric light and power plants not otherwise specified, car makers, fur workers, and mechanics in other than specified industries. The mechanics distributed throughout this whole group of industries not separately treated in the census were 32 per cent of all miscellaneous workers in 1930. Unfortunately, the census does not permit an analysis of this group for previous decades.

Grouped with the miscellaneous collection of workers in manufacturing and mechanical pursuits are broom- and brush-makers, model- and patternmakers, and straw workers, for whom the census has figures for the decades from 1870 to 1930. This Miscellaneous group has special significance in any study of occupational trends; it is not only a "catch-all" for occupations not easily classified but it represents a tendency of mod-

TABLE 178

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN THE MISCELLANEOUS GROUP, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Broom and Brush Factory Operatives	{ 5,816 5.6	8,479 4.8	10,115 4.9	10,220 2.2	11,183 4.9	12,606 2.8	9,521 1.3
Model- and Pattern-makers	{ 3,970 3.8	5,822 3.3	10,300 5.0	15,073 3.2	23,559 10.3	27,720 6.1	29,750 4.1
Straw Workers	{ 2,029 2.0	4,299 2.4	3,666 1.8	3,838 .8	5,915 2.6	14,102 3.1	1,818 .2
Other Miscellaneous Industries	{ 61,480 88.6	159,098 89.6	183,200 88.4	435,622* 93.7	177,752 77.8	389,202 85.4	678,816 92.7
Skilled Occupations (Not Elsewhere Classified) ....	{ ..... .....	..... .....	..... .....	..... .....	10,175 4.5	12,348 2.7	12,258 1.7
Total	{ 103,295 100.0	177,628 100.1	207,281 100.1	464,753 99.9	228,564 100.1	455,978 100.1	732,163 100.0

* Turpentine distillers, numbering 7,099, were included in this figure.

TABLE 179

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN THE MISCELLANEOUS GROUP, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Broom and Brush Factory Operatives	{ 5,299 5.5	7,837 5.0	8,949 4.8	8,643 2.2	9,037 6.0	10,219 3.3	7,622 1.3
Model- and Pattern-makers	{ 3,970 4.1	5,822 3.7	10,159 5.5	14,869 3.8	23,006 15.3	27,663 8.9	29,711 5.1
Straw Workers	{ 599 .6	1,531 1.0	1,243 .7	911 .2	1,945 1.3	7,751 2.5	584 .1
Other Miscellaneous Industries	{ 66,936 89.8	141,620 90.3	164,691 89.0	362,933 93.7	106,021 70.7	253,945 81.4	538,121 91.5
Skilled Occupations (Not Elsewhere Classified) ....	{ ..... .....	..... .....	..... .....	..... .....	10,032 6.7	12,319 3.9	12,227 2.1
Total	{ 96,804 100.0	156,810 100.0	185,042 100.0	387,356 99.9	150,041 100.0	311,897 100.0	588,265 100.1

ern industrial development to evolve industries, many of them too small for separate classification. Such industries are partly indicative of the growth and diversity of productive enterprise in the United States. Some of them, however, represent infant enterprises which may one day have a decisive influence upon the course of industrial affairs. Some of these industries are necessarily small, and will grow no larger, examples being quartz-stamp milling, which is facing a declining natural supply, and piano tuning.

TABLE 180

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN THE MISCELLANEOUS GROUP, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Broom and Brush Factory Operatives	{ 517 8.0	642 3.1	1,166 5.2	1,577 2.0	2,126 2.7	2,387 1.7	1,869 1.3
Model- and Pattern-makers .....	{ .... ....	.... ....	141 .6	204 .3	553 .7	57	39
Straw Workers	{ 1,430 22.0	2,698 12.9	2,423 10.9	2,927 3.8	3,970 5.1	6,351 4.4	1,234 .9
Other Miscellaneous Industries	{ 4,544 70.0	17,478 84.0	18,509 83.2	72,689 93.9	71,731 91.4	135,257 93.9	140,695 97.8
Skilled Occupations (Not Elsewhere Classified) ....	{ .... ....	.... ....	.... ....	.... ....	143 .2	29	31
Total	{ 6,491 100.0	20,618 100.0	22,239 99.9	77,397 100.0	78,523 100.1	144,061 100.0	143,896 100.0

TABLE 181

WORKERS IN MISCELLANEOUS GROUP: PERCENTAGE OF TOTAL POPULATION, OF
ALL GAINFUL WORKERS, AND OF ALL WORKERS IN MANUFACTURING
AND MECHANICAL INDUSTRIES, 1870-1930

	1870	1880	1890	1900	1910	1920	
Total population .....	.268	.354	.331	.612	.249	.431	.596
All gainful workers, male and female .....	.826	1.021	.912	1.599	.599	1.096	1.499
All in Manufacturing and Mechanical Industries	2.982	3.372	2.936	5.133	2.174	3.660	5.375
[Males of]							
All male gainful workers .....	.907	1.063	.983	1.631	.499	.943	1.545
All males in Manufacturing and Mechanical Industries	3.100	3.400	3.100	5.100	1.700	3.000	5.013
[Females of]							
All female gainful workers .....	.330	.790	.560	1.450	.960	1.680	1.340
All females in Manufacturing and Mechanical Industries ..	1.700	3.000	2.100	5.400	4.300	7.500	7.600

In 1930 this Miscellaneous group of workers totaled 732,163, or 1.49 per cent of the national labor force. The trend is difficult to trace, as census changes have altered the composition of this group from decade to decade. When a group of workers became numerically important and reappeared in growing

numbers in successive decades, the tendency was to take it out of this Miscellaneous group and attach it to some other part of the census. For this reason, too much dependence should not be placed on the trend pictured in the tables. It is apparent, however, that the group of small industries represented in this collection of workers increased substantially in the decades after 1890, with the exception of 1910. As industrial activities become more diverse and call upon skilled workers for a variety of different operations, new occupations are continually being created. It is likewise true that, as this diversity develops, and as standardization advances because of technological change, old well-established occupations become extinct.

The recent classification of occupations made by the Works Progress Administration lists over 20,000 distinct services in which people are employed. The census segregates only the numerically significant groups among this large number of occupations. It may well lose sight of small occupational groups within the manufacturing pursuits which are important not so much numerically as in terms of service rendered, expansion in numbers, and remuneration received. In fact such occupations frequently represent tasks requiring considerable skill. They are often rare occupations toward which aspirants should be directed both because there is a growing demand for such services and because opportunity for employment is wide and the compensation relatively high. Vocational counselors and educational officers would do well to examine carefully the industrial world for such occupations and direct their pupils toward them.

The trend in Miscellaneous occupations within the Manufacturing and Mechanical group is shown in Table 182.

TABLE 182
PERCENTAGE CHANGE IN TOTAL POPULATION, TOTAL GAINFULLY EMPLOYED,
AND TOTAL NUMBER OF WORKERS IN MISCELLANEOUS
GROUP, 1870-1930

Census	Total Population	Total Gain- fully Employed	Total Miscel- laneous Group
1870 .....	....	....	....
1880	+ 30.1	+ 39.1	+ 72.0
1890	+ 24.8	+ 30.7	+ 16.7
1900	+ 21.4	+ 27.9	+124.2
1910	+ 21.0	+ 31.3	- 50.8
1920	+ 14.9	+ 9.0	+ 99.5
1930	+ 16.1	+ 17.3	+ 60.6
1930 over 1870.	+218.4	+290.5	+608.8

Unfortunately, the changes made in census enumerations from decade to decade prevent any useful comment concerning the trends in comparison with the growth in the total population or of total gainfully employed. As considered by the census, this Miscellaneous group has grown in importance in the successive decades.

Sex Composition of the Miscellaneous Group

The tabulation below shows the sex composition of the Miscellaneous group.

Census	Percentages	
	Males	Females
1870	93.7	6.3
1880	88.3	11.7
1890	89.3	10.7
1900	83.3	16.7
1910	65.6	34.4
1920	68.4	31.6
1930	80.3	19.7

Because of classification changes previously mentioned it is impossible to discuss the table as if it represented the actual trend in development of the same collection of workers from 1870 to 1930. Disregarding the trends as such, it is interesting to note that females in those occupations which were listed as "miscellaneous" have increased in numbers in every decade except the last one. This is not true of males. As has been previously noticed, females are assuming an ever-greater importance in the body of manufacturing and mechanical workers, and the Miscellaneous group shows a similar condition except for the redistribution of workers in the 1920-1930 decade.

Broom and Brush Factories

The number of broom and brush factory operatives listed by the census in 1930 was 9,521. Such workers increased in numbers from 1870 to 1920 but declined in the 1920-1930 decade to below 1870 figures. However, they reached a plateau in development in 1890, which has been maintained with only small fluctuations recorded until 1930. This is true despite the fact that the total population increased 96.1 per cent from 1890 to 1930 while the number of broom- and brushmakers actually declined 5.9 per cent.

In comparison with the development of the total of gainfully employed, brush and broom operatives declined in num-

ber from 1890 to 1910, leveled off in 1920, and declined considerably in 1930. There is little possibility, in view of industrial history and present developments affecting the brush and broom industry, that this trend will alter. The prospects are for a continued slight annual decline in number of brush and broom operatives, and a drop in their proportion of the total of gainfully employed. Their number is so small, however, that this trend will not seriously affect the development of the national labor force.

The industry has not maintained a single rate of development, largely because brushmaking is subjected to much technological advance, whereas broommaking has been maintained in considerable part as an industry in which the physically handicapped, principally the blind, may work. The *Census of Manufactures* gives separate statistics on the growth of both branches of this industry, as recorded in part in Table 183.

In both the brush and broom industries the number of establishments has decreased considerably, testifying to the

TABLE 183

NUMBER OF ESTABLISHMENTS, NUMBER OF WAGE EARNERS, TOTAL WAGES PER WORKER, AND VALUE ADDED BY MANUFACTURE IN THE BRUSH AND BROOM INDUSTRIES, 1909-1929*

		1919	1929	Change, 1929 over
BRUSHES				
Number of establishments	384	379	303	- 81
Percentage change .....	....	- 1.3	-20.1	- 21.1
Average number of wage earners	6,954	7,968	7,261	307
Percentage change .....	....	+ 14.6	- 8.9	+ 4.4
Wages per worker	\$ 438	\$ 892	\$1,096	\$ 658
Percentage change .....	....	+103.6	+22.9	+150.2
Value added by manufacture per worker	\$1,080	\$2,436	\$3,286	\$2,206
Percentage change .....	....	+125.6	+34.8	+204.0
BROOMS				
Number of establishments		1,934	407	- 491
Percentage change		+ 15.1	-60.6	- 54.7
Average number of wage earners	5,199	6,313	4,542	- 657
Percentage change .....	....	+ 21.4	-28.0	- 12.6
Wages per worker	\$ 455	\$ 905	\$ 918	\$ 463
Percentage change .....	....	+ 98.8	+ 1.5	+101.7
Value added by manufacture per worker	\$1,161	\$2,035	\$3,095	\$ 934
Percentage change .....	....	+ 75.3	+ 3.0	+ 80.4

* *Census of Manufactures, 1929*, II, 1263-67. Per-worker figures computed. In 1937 establishments in the brush industry had declined to 243 and the average number of wage earners had risen to 7,915. The corresponding figures for the broom industry were: establishments 289, wage earners 4,067 (*Census of Manufactures, 1937*, "Wage Earners," p. 6).

concentration of operations in fewer centers. The value of products, even during a period of rising prices, has likewise decreased, indicating that the demand for such goods is not increasing. In fact the increasing use of vacuum cleaners and of many other automatic devices for cleaning has seriously curtailed the demand for brushes and brooms. While still necessary in domestic economy, these articles are less generally used and last longer.

These facts indicate an industry which has probably reached its peak of production and may even be entering upon a permanent decline. Wage earners, meanwhile, have not received a return proportionate to the increased value of products. In brushmaking from 1909 to 1929, when value added by manufacture per worker advanced 204 per cent, the wages per worker increased only 150 per cent.

In the case of broommakers the per-worker wage increased appreciably faster than the per-worker increase of value added by manufacture. These facts show that the broom-making industry was one of the very few in which labor made gains against other claimants.

Model- and Patternmakers

Model- and patternmakers are engaged in mechanical design in industries which produce specialties of mechanical manufacture and in handworking shops which require models and patterns for molding and casting. They are usually skilled artisans of a high order. Their number increased in every successive decade after 1870, and in 1930 totaled 29,750. While these workers are indispensable to modern industry, the number required by such extensive enterprises as characterize present-day manufacture is proportionately small, being only .061 per cent of all workers and .2 per cent of the Manufacturing and Mechanical group in 1930. Nor has their gain been proportionate to the increase in numbers in manufacture since the turn of the century, testifying to a standardization of output and of mass production which require relatively fewer such skilled workers.¹⁸⁵

The trends would indicate that Model- and Patternmakers will continue to increase in number for some time to come but that the number added in successive decades will be few, prob-

¹⁸⁵ Industries classed as "Models and Patterns" had establishments to the number of 804 in 1929 and of 594 in 1937. Average number of wage earners in 1929 was 6,778 and in 1937 was 5,728 (*Census of Manufactures, 1935*, p. 1178, and 1937, "Wage Earners," p. 20).

ably not more than 2,500 per decade. Likewise, they will probably become a somewhat smaller proportion of the total labor force as time goes on. In any event their rate of increase is too slow and their actual numbers too few to have any substantial effect upon the total of the gainfully employed of the nation.

Straw Workers

Workers making baskets, novelties, and wearing apparel from straw numbered only 1,818 persons in 1930. Their number had declined sharply from a peak of 14,102 in 1920, a decline accounted for largely by census classification.¹⁶⁸

The Straw Workers group in 1930 was only .004 per cent of the gainfully employed, a decidedly smaller proportion of that body than was recorded in any previous census. Because of its small size, such a group does not seriously influence the trend in the development of the national labor force, regardless of the shift in its numbers.

Other Miscellaneous Industries

What has been said in discussing the general characteristics of this entire group of miscellaneous workers applies particularly to this segregated division of such workers. The tables offer evidence of the trends, but they must be interpreted with great caution because of changing census classifications already explained. No further discussion is necessary here.

Skilled Occupations (Not Elsewhere Classified)

This collection of skilled workers—12,258 in 1930—includes a wide variety of skilled artisans related to many small manufacturing industries. They cannot be described in detail for lack of suitable data. But they appear to be a body of workers which has maintained its numerical strength during the past three decades, with little indication that this will either increase or diminish greatly within the immediate future. In 1930 they made up .02 per cent of the total of gainfully employed, and their trend of development is such that they are now a slightly smaller proportion of that body than they were in 1910. It is improbable that their development will alter sufficiently in the near future to affect seriously the composition of the total gainfully employed.

¹⁶⁸ At prior censuses the "Hat, straw" industry embraced all establishments engaged primarily in the manufacture of men's, women's, and children's straw hats. In the 1930 census, however, workers in the manufacture of women's and children's straw hats were transferred to the "Millinery Industry."

CHAPTER VI

TRANSPORTATION AND COMMUNICATION

General Characteristics (Tables 184 to 187, Charts 6 and 11)

Rapid communication and transportation not only characterize our modern economy but made it possible. As has been well stated by Leonard in his thought-provoking book, *Tools of Tomorrow*,¹ the development of mass production where technology will be used to its practical limits is not hindered by any single technical factor except the movement of men and materials from place to place and the level of efficiency of the communication system which is necessary to make these operations continuous. Mass production, the distribution of goods, and the rendering of adequate services require the centralization of equipment and man power, with lines of communication and transportation operating so well that materials can be quickly moved, people easily transported, and goods efficiently distributed.

Transportation and communication consequently have been the keys to the progress which has manifested itself in the rapid development of our industrial civilization, especially since the Civil War. In the days of American pioneering, the settlement of the land was accomplished by oxcarts and by horse-drawn wagons moving the goods and chattels of sturdy, independent farmers who set up largely self-contained economies on the land and were separated frequently by a good half-day's journey from their nearest neighbors. When their crops were harvested and only rarely on other occasions did they have need of transportation facilities to connect them with the closest village.

As infant American manufacturing industries produced more and more goods, as land-settlers became established and surplus crops were grown, transportation facilities were required to exchange farm produce for store goods, household furnishings, wearing apparel, and farm implements. Roadways, waterways, and railways were developed to accomplish these purposes. The construction of military roads during the

¹ Jonathan Leonard, *Tools of Tomorrow*, Viking Press, New York, 1935, pp. 186 ff.

TABLE 184

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN TRANSPORTATION AND COMMUNICATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Road and Street Transportation	{ 146,846 36.4	223,496 38.3	449,292 41.2	637,518 43.7	578,363 23.0	821,308 26.9	1,720,302 43.0
Steam Railroads	{ 154,027 38.2	236,058 40.5	462,213 42.4	582,150 40.0	1,195,948 47.6	1,316,216 43.1	1,207,806 30.2
Street Railroads	{ 5,103 1.3	11,687 2.0	37,434 3.4	68,919 4.7	157,671 6.3	177,146 5.8	149,831 3.7
Water Transportation	{ 88,982 22.0	88,587 15.2	76,874 7.1	78,406 5.4	153,180 6.1	179,365 5.9	180,111 4.5
Air Transportation .....	{ .... ....	.... ....	.... ....	.... ....	.... ....	1,312 .1	12,883 .3
Communication	{ 8,316 2.1	23,166 4.0	63,348 5.8	89,739 6.2	369,249 14.7	513,390 16.8	663,267 16.6
Other Transportation and Communication Pursuits	{ .... ....	.... ....	.... ....	.... ....	56,087 2.2	45,046 1.5	64,506 1.6
Total	{ 403,274 100.0	532,944 100.0	1,089,161 99.9	1,456,732 100.0	2,510,498 99.9	3,053,783 100.1	3,998,206 99.9

TABLE 185

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Road and Street Transportation	{ 146,637 36.4	223,463 38.5	448,969 41.6	636,345 44.5	577,955 24.1	819,033 28.9	1,717,483 46.2
Steam Railroads	{ 153,965 38.2	235,611 40.5	460,771 42.7	580,462 40.6	1,190,399 49.7	1,304,910 46.1	1,201,473 32.3
Street Railroads	{ 5,102 1.3	11,683 2.0	37,423 3.5	68,873 4.8	157,405 6.6	176,202 6.2	149,888 4.0
Water Transportation	{ 88,941 22.1	88,478 15.2	76,823 7.1	78,253 5.5	153,019 6.4	178,972 6.3	180,048 4.8
Air Transportation .....	{ .... ....	.... ....	.... ....	.... ....	.... ....	1,304 .1	12,304 .3
Communication	{ 7,961 2.0	21,891 3.8	54,205 5.0	67,183 4.7	280,841 10.9	804,063 10.7	392,697 10.6
Other Transportation and Communication Pursuits	{ .... ....	.... ....	.... ....	.... ....	55,505 2.3	44,825 1.6	63,198 1.7
Total	{ 402,606 100.0	531,126 100.0	1,078,211 99.9	1,431,116 100.1	2,395,124 100.0	2,828,809 99.9	3,716,591 99.9

Civil War added greatly to the nation's land transportation facilities.²

² Harold Underwood Faulkner, *American Economic History*, Harper & Brothers, New York, 1924, third edition, p. 454.

TABLE 186

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN TRANSPORTATION AND COMMUNICATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Road and Street Transportation	{ 209 81.8	33 1.8	303 2.8	1,173 4.6	408 .4	2,275 1.0	2,819 1.0
Steam Railroads	{ 62 9.3	447 24.6	1,442 13.2	1,638 6.6	5,540 4.8	11,306 5.0	6,833 2.2
Street Railroads	{ 1 .1	4 .2	11 .1	46 .2	266 .2	944 .4	443 .2
Water Transportation	{ 41 6.1	59 3.2	51 .5	153 .6	161 .1	393 .2	63*
Air Transportation .....	{ .... ....	.... ....	.... ....	.... ....	.... ....	8*	79*
Communication	{ 355 53.1	1,275 70.1	9,143 83.5	22,556 88.1	106,408 94.0	209,327 93.0	270,570 96.1
Other Transportation and Communication Pursuits	{ .... ....	.... ....	.... ....	.... ....	582 .5	721 .3	1,306 .5
Total	{ 668 99.9	1,818 99.9	10,950 100.1	25,616 100.1	115,874 100.0	224,974 99.9	281,615 100.0

* Less than .001 per cent.

TABLE 187

WORKERS IN TRANSPORTATION AND COMMUNICATION: PERCENTAGE OF TOTAL
POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	1.046	1.162	1.739	1.917	2.730	2.889	3.256
All gainful workers, male and female	3.225	3.352	4.790	5.011	6.578	7.338	8.188
[Males of] All male gainful workers	3.773	3.941	5.729	6.025	7.959	8.555	9.760
[Females of] All female gainful workers .....	.036	.069	.280	.481	1.429	2.631	2.619

The continued settlement of America was made possible by a transformation in water travel from the slow and dangerous wooden sailing vessel of the seventeenth century to the great steel steamers of today. Immigration originally was attracted to our shores by the hope of better living conditions in a free-land country. After the Civil War industrial labor could find immediate employment, and immigrants came in great numbers. Revolutionary changes in water transportation had no

small part in their coming. Without these changes, it is probable that no such tide of immigration would have reached our shores, at least in so short a period of time.

The inland waterways added their share to transportation, especially with the building of canals such as the Erie. But it remained for the railroad, which had been introduced in the second quarter of the nineteenth century, to connect the sources of raw material used in manufacture, the food supply of the country, and the industrial and commercial centers. Thus in the development of the railroads can be found the greatest single factor in establishing a system of transportation without which our modern industrial development could hardly have taken place. The epoch-making expansion in transportation took place after the Civil War. From a mere 30,000 miles of road operated in 1860, railways increased to 250,000 miles by 1910.³ The recency of our transportation system can be shown by the fact that our Western country, rich in possibilities but sparsely settled, was not reached by any transcontinental railway until 1869.

Hardly less momentous has been the development of our communication system. From the day of the first transmission of telegraph messages from Baltimore to Washington, D.C., in 1844, the linking of centers of population by wire advanced so rapidly that the Western Union's lines reached the Pacific by 1861. The telegraph had a very much restricted use, however, and it was not until the telephone was made practical in 1879 that communication began to keep abreast of the advances which were being made in transportation.⁴

The electric railway and the automobile have come into general use very recently. The first overhead trolley line was built in Kansas City in 1884, and by 1920 single track mileage of street railways totaled 47,705.⁵ The automobile, which had been experimented with for a century, became a practical vehicle about 1903. By 1930 the number of registered automobiles in the United States had increased to 26,545,281. The airplane is yet an infant member of the transportation group, but its future is most promising.

More recently, telephone communication improvements such as automatic dialing have been made, and the radio has

³ Harold Underwood Faulkner, *American Economic History*, Harper & Brothers, New York, 1924, third edition, pp. 452, 453.

⁴ *Ibid.*, pp. 334-35, 487.

⁵ *Ibid.*, pp. 483-84.

changed advertising methods and entertainment. The field of television, which will still further change our methods of communication, has been explored and its commercial manufacture is at hand.

The Transportation and Communication category is a service group including those persons necessary for the construction, maintenance, and repair of transportation and communication systems, as well as the operating, supervising, official, and business personnel; but it does not include clerical or professional occupations. The number of persons constituting the labor force available for transportation and communication in 1930 totaled 3,998,206, which was 3.2 per cent of the entire population and 8.1 per cent of all gainfully employed. The 1910-1930 percentage distribution of these workers is displayed below. The first column shows the percentage each group is of all transportation and communication workers when laborers are distributed according to the group in which they work; the second column gives the percentages when laborers are shown as a separate group.

Group	1910		1920		1930	
Air Transportation .....	....	....	....	....	.3	.3
Road and Street Transportation	23.0	22.9	26.9	25.8	43.0	40.3
Steam Railroads	47.6	26.0	43.1	27.7	30.2	19.3
Street Railroads	6.3	5.1	5.8	5.0	3.7	3.1
Water Transportation	6.1	5.5	5.9	5.7	4.5	4.2
Communication	14.7	14.3	16.8	16.1	16.6	15.8
Miscellaneous	2.2	2.2	1.5	1.3	1.6	1.5
Laborers .....	....	24.0	....	18.3	....	15.5
Total	99.9	100.1	100.0	99.9	99.9	100.0

Road and street transportation occupations, with laborers either included or omitted, have become the dominant group, probably because of the widespread use of the automobile for both private and commercial purposes and the consequent necessity for better roads. When laborers are not included, steam-railroad workers have declined in relative importance within the Transportation and Communication group of occupations from their maximum of 42 per cent of that body in 1890 (see Table 184). But the inclusion of laborers brings this group to a place of greater numerical importance than that of

any other group in 1910 and 1920. Street railroads have recently declined somewhat in relative importance.

The inclusion or exclusion of laborers affects figures for the Communication group of occupations somewhat. This group has expanded since 1870, when it comprised only 2.1 per cent of all transportation-communication workers, to about 16 per cent in 1930. Water-transportation workers have become less than 5 per cent of all persons in Transportation and Communication, whereas in 1870 they were 22 per cent of that body. When all laborers in construction and maintenance of transportation and communication are considered, it is found that they have declined in relative importance since 1910.

From 1870 to 1900 the number of new workers added to the Transportation and Communication group was 1,053,458; but during the next thirty years the increase was 2,541,474. In fact in the decade ending in 1930 almost a million new workers were added to this labor force, the largest decennial addition since 1890 except that of 1900-1910. But the character of this addition has changed greatly. In the period from 1900 to 1910, new workers were added in communication primarily as a result of the telephone, and in transportation new workers were added in electric street railways, steam railways, and water commerce. Even with the inclusion of laborers, road and street transportation indicated a loss during the decade when the automobile was being introduced and livery and drayage businesses were being closed. The gain from 1920 to 1930, however, was largely in road and street transportation. Within this group the gain is accounted for almost entirely by the enormous increase in the number of taxi drivers, chauffeurs, garage operators, tractor operators, and auto mechanics.

Two of the six numerically important groups in Transportation and Communication, namely, steam and street railroads, show an actual numerical decline from 1920 to 1930. Water transportation remained stationary during this decade. Judging by the trends, it appears that transportation and communication occupations will attract more workers in the immediate future but that the shift will be away from the old established lines into automobile and airplane transportation and wireless communication of several kinds. Whether these newer forms of transportation and communication will require the same kind, quality, or amount of labor remains to be seen. If they fail to do so, a serious occupational displacement will

occur such as was experienced when liverymen and drivers were almost entirely supplanted through the use of the automobile. If these newer forms tend toward automatic operation, as is evidenced in the latest methods of electrical signaling and communication, there is considerable possibility that fewer workers will man the transportation and communication systems with even more efficiency than is the case today.

Increase of Transportation and Communication Workers Relative to That of the Population and of All Gainful Workers

In comparison with the growth in the total population and in the total of gainful workers, transportation and communication workers have developed, as seen in Table 188.

TABLE 188

PERCENTAGE INCREASE IN TOTAL POPULATION, IN THE TOTAL GAINFULLY EMPLOYED, AND IN THE TOTAL OF TRANSPORTATION-COMMUNICATION WORKERS, 1870-1930

Census	Total Population	Total Gainfully Employed	Total in Transportation and Communication
1870 .....	.....	.....	.....
1880	30.1	39.1	44.5
1890	24.8	30.7	86.8
1900	21.3	27.9	33.7
1910	21.0	31.3	72.3
1920	14.9	9.0	21.6
1930	16.1	17.3	30.9
1930 over 1870.....	218.4	290.5	891.4

During the sixty years, the increase in number of transportation and communication workers was over three times as fast as that of the total gainfully employed. The decennial development has been very erratic, however, reflecting inventions and the introduction of new methods of transportation and communication which drastically affect the labor force engaged in these fields. The gains made from 1910 to 1930 have been at a lesser rate than in any previous decades of the sixty years. They are still proportionately much greater than the increase in population or the gain in the national labor force, so that while the rate of growth is slackening, Transportation and Communication still absorbs proportionately more new workers than most other major occupational groups.

Sex Composition of the Transportation and Communication Group

The sex ratio of workers engaged in transportation and communication is shown for the decades from 1870 to 1930 in the following display:

Census	Percentage	
	Males	Females
1870	99.8	.2
1880	99.7	.3
1890	99.0	1.0
1900	98.2	1.8
1910	95.4	4.6
1920	92.6	7.4
1930	93.0	7.0

It will be noticed that female workers have shown continual increases in their proportion of the total of transportation and communication workers. Although male workers have declined in their proportion of the entire group, their number in transportation is so large that they account for the unusual growth of the group as a whole. In the more recent years, men continue to predominate in such work, the communication service being the only field in which women appear in any appreciable numbers (Table 186). In 1930, 96 per cent of all females engaged in transportation and communication were located in the latter sphere of activity. A few more women were listed as chauffeurs and truck and tractor drivers in 1930 than in 1920; and since the 1930 census was taken women have made some advances in air transportation, where they are employed as stewardesses, and in the Pullman and the bus services, where they work as attendants. For the most part, however, the character and conditions of the work required in transportation exclude any large number of females. The unusual gain in the last decade in the field of automobile transportation, which is almost wholly confined to men, halted the previous increase that females were making in their proportion of all transportation and communication workers.

Road and Street Transportation (Tables 189 to 194)

Until 1910 the work of road and street transportation was confined largely to draymen, teamsters, and carriage drivers. This was the "horse-and-buggy" era to which so much present-day reference is made. But the practical introduction of the

TABLE 189

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN ROAD AND STREET TRANSPORTATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Draymen, Teamsters, and Carriage Drivers	{ 120,756 82.2	{ 177,586 79.5	{ 368,490 82.0	{ 538,083 84.5	448,845	420,189	152,194 ^a
Hostlers and Stable Hands	{ 17,586 12.0	{ 31,697 14.2	{ 54,036 12.0	{ 64,929 10.2	63,388	18,976	6,654
Livery-Stable Keepers	{ 8,504 5.8	{ 14,213 6.4	{ 26,757 6.0	{ 33,656 5.3	....	....	....
Garage Owners, Managers, and Officials	{	{	{	{	5,279	42,151	69,965
Owners and Managers, Truck, Transfer, and Cab Companies .....	{ ....	{ ....	{ ....	{ ....	.9	5.1	4.1
Workers in Garages, Greasing Stations, and Auto Laundries	{	{	{	{	15,598	23,497	41,084
Workers in Automobile Repair Shops	{	{	{	{	2.7	2.9	2.4
Mechanics, ^c Automobile Factories, Garages, and Repair Shops	{	{	{	{	4,468	81,450	78,345 ^b
Bus Conductors .....	{ ....	{ ....	{ ....	{ ....	.8	3.8	4.3
Chauffeurs and Truck and Tractor Drivers .....	{ ....	{ ....	{ ....	{ ....	....	....	9,452
	{ ....	{ ....	{ ....	{ ....	....	....	5
	{ ....	{ ....	{ ....	{ ....	....	....	394,168
	{ ....	{ ....	{ ....	{ ....	....	....	22.9
	{ ....	{ ....	{ ....	{ ....	....	....	1,002
	{ ....	{ ....	{ ....	{ ....	....	....	1
	{	{	{	{	45,785	285,045	972,418
	{	{	{	{	7.9	84.7	56.5
Total	{ 146,846 100.0	{ 223,496 100.1	{ 449,292 100.0	{ 637,518 100.0	578,963	821,308	1,720,302
					100.0	100.0	100.0

^a Figures for 1930 include truck, transfer, and cab laborers.

^b The 1930 figures include 6,652 foremen and overseers.

^c Not otherwise specified.

"horseless carriage" in the decade following the turn of the century revolutionized the mode of road and street transportation. Livery-stable men disappeared as such and either became garage proprietors or sought other occupations. Hostlers and drivers suffered great losses in numbers. They were not completely eliminated, however, for at the 1930 census motor-driven vehicles had not entirely supplanted horses. It is probable that these occupations will be reduced rapidly to the few drivers and hostlers required on horse farms, the estates of the wealthy, and race tracks. It would appear from the trends that the day of horse-drawn vehicles in transportation is rapidly coming to a close.

The motor-transport industry, on the other hand, is still growing rapidly. In 1910, when the census first recorded such

TABLE 190

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
ROAD AND STREET TRANSPORTATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Draymen, Teamsters, and Carriage Drivers	{ 120,560 82.2	177,586 79.5	368,265 82.0	538,029 84.5	443,735 76.8	419,450 51.2	152,098 ^a 6.9
Hostlers and Stable Hands	{ 17,584 12.0	31,697 14.2	54,014 12.0	64,850 10.2	63,382 11.0	18,973 2.3	6,654 .4
Livery-Stable Keepers	{ 8,493 5.8	14,180 6.3	26,710 5.9	33,466 5.3	....	....	....
Garage Owners, Managers, and Officials .....	{ ....	....	....	....	5,256 .9	41,944 5.1	69,543 4.0
Owners and Managers, Truck, Transfer, and Cab Companies .....	{ ....	....	....	....	15,368 2.7	23,231 2.8	40,508 2.4
Workers in Garages, Greas- ing Stations, and Auto Laundries .....	{ ....	....	....	....	4,462 .8	31,339 3.8	73,186 ^b 4.3
Workers in Automobile Rep- air Shops .....	{ ....	....	....	....	....	....	9,407 .5
Mechanics, ^c Automobile Factories, Garages, and Repair Shops .....	{ ....	....	....	....	....	....	394,169 22.9
Bus Conductors .....	{ ....	....	....	....	....	....	1,002 .1
Chauffeurs and Truck and Transfer Drivers .....	{ ....	....	....	....	45,752 7.9	284,096 34.7	970,916 56.5
Total	{ 146,637 100.0	223,463 100.0	448,989 99.9	636,345 100.0	577,955 100.1	819,033 99.9	1,717,438 100.0

^a Figures for 1930 include truck, transfer, and cab laborers.

^b The 1930 figures include foremen and overseers.

^c Not otherwise specified.

occupations separately, only 45,785 persons were listed as occupational drivers of motor vehicles; their number increased to 972,418 by 1930. In view of such conditions as the extension of road-transportation service beyond cities, and the change from streetcars and interurban railroads to busses, a still greater growth in the number of motor drivers is predictable for the immediate future.

Mechanics working in automobile factories or repair shops were listed separately in the census for the first time in 1930. Their number in 1930 was large—394,188—and may represent a very substantial increase over the number of such workers which would have been reported had the census enumerated them separately in the two previous decades. While they should continue to increase in numbers, somewhat in keeping

TABLE 191

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN ROAD AND STREET TRANSPORTATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Draymen, Teamsters, and Carriage Drivers	{ 196 93.8	....	234 77.2	904 77.1	110 27.0	739 32.5	96 ^a 3.4
Hostlers and Stable Hands	{ 2 1.0	....	22 7.3	79 6.7	6 1.5	3 .1	....
Livery-Stable Keepers	{ 11 5.3	33 100.0	47 15.5	190 16.2	....	....	....
Garage Owners, Managers, and Officials .....	{ ....	....	....	....	23 5.6	207 9.1	422 15.0
Owners and Managers, Truck, Transfer, and Cab Companies .....	{ ....	....	....	....	230 56.4	266 11.7	576 20.4
Workers in Garages, Greasing Stations, and Auto Laundries .....	{ ....	....	....	....	6 1.5	111 4.9	159 ^b 5.6
Workers in Automobile Repair Shops .....	{ ....	....	....	....	....	....	45 1.6
Mechanics,* Automobile Factories, Garages, and Repair Shops .....	{ ....	....	....	....	....	....	19 .7
Bus Conductors .....	{ ....	....	....	....	....	....	....
Chauffeurs and Truck and Transfer Drivers .....	{ ....	....	....	....	33 8.1	949 41.7	1,502 53.3
Total	{ 209 100.1	33 100.0	303 100.0	1,173 100.0	408 100.1	2,275 100.0	2,819 100.0

* Figures for 1930 include truck, transfer, and cab laborers.

^b The 1930 figures include foremen and overseers.

* Not otherwise specified.

with the increase in number of motor-driven vehicles in use, some offsetting factors must be mentioned, namely, the longer life of the modern car, its mechanical efficiency, and the labor-saving repair equipment being installed in garages. Furthermore, several of the manufacturers of standard cars are establishing factory-overhaul policies which may greatly reduce the work of automobile mechanics in neighborhood or city garages.

Garages have almost entirely supplanted livery stables. The first garages were usually places where mechanics could repair in their spare time the few automobiles then operated. The introduction of the automobile was the golden opportunity for many mechanical artisans who became proprietors through the exercise of their skill in repairing cars. From a mere hand-

TABLE 192

WORKERS IN ROAD AND STREET TRANSPORTATION: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population.....	.381	.446	.717	.839	.629	.777	1.401
All gainful workers, male and female.....	1.174	1.285	1.976	2.193	1.515	1.974	3.523
All in Transportation and Communication.	36.413	38.339	41.251	43.764	23.038	26.895	43.027
[Males of]							
All male gainful workers	1.374	1.516	2.386	2.679	1.921	2.477	4.510
All males in Transpor- tation and Commu- nication	36.422	38.453	41.642	44.465	24.130	28.953	46.211
[Females of]							
All female gainful workers .....	.011	.001	.008	.022	.005	.027	.026
All females in Trans- portation and Com- munication	31.287	1.815	2.767	4.579	.354	1.011	1.001

TABLE 193

DRAYMEN, TEAMSTERS, AND CARRIAGE DRIVERS: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1870-1930*

Base	1870	1880	1890	1900	1910	1920	1930
All gainful workers, male and female*....	.966	1.021	1.621	1.854	1.163	1.010	.312
All in Transportation and Communication.	29.944	30.464	33.833	36.996	17.680	13.760	3.807
[Males of]							
All male gainful workers	1.130	1.204	1.957	2.265	1.475	1.269	.401
All males in Transpor- tation and Commu- nication	29.945	30.559	34.155	37.595	18.527	14.828	4.092

* Teamsters in Agriculture, Forestry, and Extraction of Minerals are classified with other workers in those industries, respectively; drivers for bakeries and stores are classified as deliverymen in Domestic and Personal Service. Prior to 1910 the designation for this group varied; the attempt to distinguish chauffeurs and motor-truck drivers from draymen, teamsters, and carriage drivers was not very successful in 1910, 1920, and 1930. Laborers in truck, transfer, and cab companies are included in the 1930 figure.

° Numbers of women are so small as to have only minor significance; see Table 191.

TABLE 194

CHAUFFEURS, TRUCK AND TRACTOR DRIVERS: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1910-1930*

Base	1910	1920	1930
Total population .....	.050	.270	.792
All gainful workers, male and female*.....	.120	.685	1.991
All in Transportation and Communication.....	1.824	9.334	24.321
[Males of]			
All male gainful workers .....	.152	.859	2.550
All males in Transportation and Communication...	1.910	10.043	26.124

* In 1910, 1920, and 1930 no attempt was made to distinguish chauffeurs and motor-truck drivers from draymen, teamsters, and carriage drivers.

* Numbers of women are so small as to have only minor significance; see Table 191.

ful of garage operators in 1910—for the census listed only 5,279 in the entire country that year—their number increased to 69,965 by 1930. Their number will probably continue to increase. But the extension of the garage business into every neighborhood has probably come to a halt, and future increases will likely be much fewer than during the 1920's. In fact, the garage business is fast reaching that degree of maturity where it is subject to the need for adequate capital to equip and stock a modern plant. Furthermore, many of the incidental services formerly rendered by neighborhood garages are now a part of the work of superservice stations. The probable result of these several trends will be a decline in the rate of growth in numbers of garage owners, a tendency toward concentration of ownership and increase in size of plant, and the employment of proportionately more garage managers.⁶

Many truck and transfer companies and individual proprietors motorized their equipment and continued in business when the horse-drawn vehicle was supplanted by the automobile. New operators also entered the field. Their number increased rapidly after 1910 from 15,598 to 41,084 in 1930.

⁶ Craft workers in the larger garages are listed as all-round mechanics, specialized auto-mechanic electricians, floor mechanics, shop foremen, blacksmiths, sheet metal workers, wood workers, trimmers, glass installers, and painters. Attendants and helpers include oilers and greasers, gas-station attendants, and car washers and polishers.

The number of these workers has increased rapidly and in 1939 amounted to over half a million persons. In view of the steadily expanding use of automobiles it is reasonable to assume that these occupations will continue to expand, especially for the more competent workers.

See "Automobile Industry," Revised, *Occupations: A Series of Vocational Studies*, NYA of Illinois (W. J. Campbell, State Director), Chicago, 1939; also mimeographed bulletin of the NYA of Wisconsin on auto mechanics and allied vocations, Madison, Wisconsin, May 27, 1937.

Large motor-transportation companies have been formed. The railroads have added motor transport to their freight facilities, and the trend is decidedly in the direction of an increasing amount of freight being handled in this way.

Table 195 gives certain available information on road and street transportation.

TABLE 195

NUMBER OF CONCERNS, AVERAGE NUMBER OF EMPLOYEES, AND AMOUNT OF PAID PASSENGERS AND FREIGHT CARRIED IN THE UNITED STATES IN RECENT YEARS*

	Amount	Percentage
<i>Common carrier motor bus transportation</i>		
Number of concerns.....	1,751	100.0
Local	791	42.2
Intrastate	709	40.5
Interstate	251	14.3
Number of employees.....	39,613	100.0
Local	14,743	37.2
Intrastate	9,023	22.3
Interstate	15,847	40.0
<i>Motor trucking for hire</i>		
Number of concerns.....	61,216	100.0
Local	45,685	74.6
Intrastate	10,217	16.7
Interstate	5,314	8.7
Number of employees.....	158,283	100.0
Local	68,516	43.3
Intrastate	37,561	23.7
Interstate	52,206	33.0
<i>Freight traffic in United States</i>		
Billion ton miles, 1932.....	340	100.0
Railroad	236 ^a	69.0
Highway	35	11.0
All other kinds (water and pipe lines)....	69	20.0
<i>Passenger traffic in United States</i>		
Billion passenger miles, 1933.....	377.8	100.0
Auto bus	3.4	0.9
Railroads	16.3 ^b	4.3
Airplanes	0.2 ^c	0.1
Private autos	357.9	94.7

* Figures on common carriers, bus, and motor truck transportation secured for year 1935 from *Census of Business*, 1937, p. 5. Figures on freight and passenger traffic for years as indicated are from *Federal Coordinators' Freight and Passenger Traffic Reports* for 1932 and 1933. Also *World Economic Review*, 1935, p. 79, and *Statistics of Railway in United States*, 1935, pp. 5, 113, and *Year Book*, 1938, p. 506. For additional information on this topic, see "Motor Bus Transportation" and "Motor Trucking for Hire," separate reports of the *Census of Business*, 1935.

^a 290 in 1938.

^b 21.8 in 1938.

^c .36 in 1935.

A comparison of the figures on number of local common carriers and their employees shows that many such enterprises are small businesses in which the owner alone is employed. Interstate businesses, on the other hand, while constituting only a relatively small percentage of all common carriers, are large institutions depending almost entirely upon hired workers. These conditions are even more pronounced with respect to motor trucking.

Unfortunately the figures on freight and passenger traffic are neither complete nor exactly comparable as to time involved. Consequently, they permit of only a rough comparison. Highway freight traffic, while substantial, is still a minor fraction of all freight transported. But passenger transportation presents quite a different picture, with private automobiles carrying over 90 per cent of all persons who have occasion to move from place to place. Among common carriers, busses had so far encroached upon railroads and streetcars that by 1933 they were carrying 17 per cent of all passengers transported by common carriers.

While there were 24,200,000 private automobiles registered in the United States in 1936,¹ this does not mean that all adults have such means of transportation. There are still a very large number of people who, if they possessed the means to buy and operate a car, would be added to the list. However, car manufacture is largely dependent upon replacement sales of luxury vehicles to comparatively wealthy or at least well-to-do persons, and these sales in turn depend primarily upon the used-car sale to moderately circumstanced working-class families. A depression, or even a slump in business which interferes with the regular flow of the relatively small purchasing fund received by these people in their wages, eliminates the possibility of owning and operating an automobile and increasingly forces these workers to depend upon busses and streetcars as their means of transportation.

The initial cost of a modern car, even with the term-payment plans available, is much too high to put it within the means of the person who requires cheap, dependable transportation. It is estimated that approximately 50 per cent of the list price of new cars must be added to cover the advertising,

¹ *Technological Trends and National Policy*, National Resources Committee, United States Government Printing Office, Washington, D.C., 1937, pp. 177-78.

agents' commissions, and other sales costs involved. As Leonard remarks:⁸

At present there is on the market no cheap "utility car" suited to people of small means. The poor man must buy either luxury, shabby and shaky luxury (in an old used car), or nothing. It is rather as if clothing manufacturers had abolished overalls in order to force farmers and laborers to wear tailored woolen suits to work. . . . The manufacturers know, and it probably gives them sleepless nights, that a large section of the public would jump at the chance to buy a new "utility car" at \$200. There is nothing impossible about the figure.

With technology so well advanced in the automotive industry, only commercial and financial factors prevent the buying public from being able to have as much automobile transportation as they need. Technology has made it possible to build cars which will perform quite well at a cost of less than half as much as present-day moderate-priced American automobiles. While highways have been greatly improved, thus facilitating motor transportation, much more needs to be done if this mode of moving persons and goods is to become universal. The mileage of hard-surfaced or paved roads had increased from about 144 miles in 1904 to 693,559, or over 330 per cent, by 1930.⁹ But much needs yet to be done if such roads are to prove adequate for high-speed motor transportation.

On this point an authority states:

There is the demand for long mileages of usable roads, only possible to be met by quantity production of the lower cost types. There is the demand for roads to carry heavier loads than ever before, only possible to be met by scientifically designed surfaces. There is the demand for snow removal in the north reaches; a demand for smooth, dustless surfaces; a demand for beautiful roadsides; and a ruthless public insistence to hurry, hurry. No nation is rich enough to meet these demands except through the development of the most economical methods and the most efficient administration. . . .

Hence, scientific research is fundamental in both the physical and the economic fields—research directed to economy and efficiency of planning and building. Much progress has been made in this direction; more is needed, and the possibilities seem always greater. But it demands the highest technical training and patience. Not alone skilled technical intelligence is needed, but honest and efficient administration. The building of adequate highways for a state or a nation is not possible except by long-continued and consistent programs.¹⁰

⁸ Jonathan N. Leonard, *op. cit.*, quotation from pp. 221-22.

⁹ Malcolm M. Willey and Stuart A. Rice, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 167 ff.

¹⁰ T. H. MacDonald, Chief, United States Bureau of Public Roads, in introduction to *Highway Construction Administration and Finance*, by E. W. James, Chief, Division of Design, United States Bureau of Public Roads.

It is highly probable, despite the rapid introduction of labor-saving construction machinery, that more workers will be needed in road construction. It is likewise probable that, through either domestic or foreign competition, the automotive industry eventually will turn its attention to supplying the needs of the great mass of people for low-priced cars. It is also probable either that the high price of motor fuel and oil, which is maintained largely by the few dominant corporations which control the industry, will be substantially reduced or that because of the universality of the need for transportation-fuel public policy will regulate the price to be charged, thus putting it within the reach of persons with lower incomes.

When these possibilities become actual, the field of transportation will be greatly changed. It is in terms of such changes that the future need for transportation workers will be established. All such trends suggest an increasing use of the automobile, and with this use will come the need for more mechanics, garage men, chauffeurs, bus operators, auto-laundry workers, and others who are needed to keep this major part of the transportation system functioning smoothly.

Steam Railroads (Tables 196 to 200)

The census gives the total number of workers in steam railroads for the past sixty years, but the data are too involved to permit segregation by kinds of workers before 1910. Since that time, however, the series is quite complete and permits detailed analysis. In 1930 the number of workers, other than laborers, in steam railroads totaled 772,748, which was 1.5 per cent of the total gainfully employed and 19 per cent of all transportation and communication workers.

To make the census series comparable, laborers must be added, beginning with 1910. These figures may be found in Table 196. The increase in number of all persons engaged in this work during the past sixty years is a rough measure of the growing importance of steam railways as a means of moving passengers and goods. From 154,027 persons in 1870, which was the number required in the first period of intensive railroad construction, such workers increased until 1920, when the peak of railroad operation was reached with 1,316,216 workers. The decline of 108,410 in workers in the decade ending in 1930 was distributed among operating crews and laborers, and reflects the competition of motor and air transport as well as

TABLE 196

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN STEAM RAILROADS, 1910-1930*

Group	1910	1920	
Officials and Superintendents	19,805	32,426	34,380
	1.7	2.5	2.8
Foremen and Overseers	65,260	73,046	73,910
	5.5	5.5	6.1
Ticket and Station Agents	24,138	26,585	27,160
	2.0	2.0	2.2
Baggagemen and Freight Agents	17,033	16,819	16,377
	1.4	1.3	1.4
Inspectors	27,661	42,721	39,079
	2.3	3.2	3.2
Conductors	65,604	74,539	73,332
	5.5	5.7	6.1
Locomotive Engineers	96,229	109,899	101,201
	8.0	8.3	8.4
Locomotive Firemen	76,381	91,345	67,096
	6.4	6.9	5.6
Brakemen	92,572	114,107	88,197
	7.7	8.7	7.3
Motormen	2,487	3,560	2,754
	.2	.3	.2
Switchmen and Flagmen	73,419	101,917	92,217
	6.1	7.7	7.6
Yardmen	9,575	7,148	7,948
	.8	.5	.7
Boilerwashers and Engine Hostlers	10,409	25,305	18,300
	.9	1.9	1.5
Car- and Railroad-Shops Operatives	47,783	97,979	88,178*
	4.0	7.4	7.3
Laborers	543,168	470,199	435,058
	45.4	35.7	36.0
Other Occupations	24,424	28,621	42,619
	2.0	2.2	3.5
Total	1,195,948	1,316,216	1,207,8
	99.9	99.8	99.9

* It is impossible to make an accurate breakdown for the 1870 to 1910 decades.

* This figure is made up of railroad- and car-shops operatives, 65,008; railroad- and car-shops mechanics, 21,847; apprentices in steam railroads, 1,323.

the increasing technological efficiency of steam railways. This decrease in number of workers did not affect officials, superintendents, yard men, and ticket and station agents, who actually increased in numbers from 1920 to 1930. It would appear that the desperate efforts of the railroads to maintain their hold on business and the tangled state of their financial affairs required additions to their forces in these departments.

TABLE 197

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS ON STEAM RAILROADS, 1910-1930*

Group	1910	1920	
Officials and Superintendents	19,803	32,385	34,359
	1.7	2.5	2.9
Foremen and Overseers	65,038	72,980	73,860
	5.5	5.6	6.1
Ticket and Station Agents	22,930	24,324	25,370
	1.9	1.9	2.1
Baggagemen and Freight Agents	17,028	16,789	16,361
	1.4	1.3	1.4
Inspectors	27,525	42,675	39,066
	2.3	3.3	3.3
Conductors	65,604	74,539	73,332
	5.5	5.7	6.1
Locomotive Engineers	96,229	109,899	101,201
	8.1	8.4	8.4
Locomotive Firemen	76,381	91,345	67,096
	6.4	7.0	5.6
Brakemen	92,572	114,107	88,197
	7.8	8.7	7.3
Motormen	2,487	3,560	2,754
	.2	.3	.2
Switchmen and Flagmen	73,367	101,359	91,928
	6.2	7.8	7.7
Yardmen	9,575	7,145	7,948
	.8	.5	.7
Boilerwashers and Engine Hostlers	10,409	25,271	18,300
	.9	1.9	1.5
Car- and Railroad-Shops Operatives ...	47,406	97,003	87,743*
	4.0	7.4	7.2
Laborers	539,920	463,613	431,947
	45.3	35.5	36.0
Other Occupations	24,125	27,916	42,011
	2.0	2.1	3.5
Total	1,190,399	1,304,910	1,201,473
	100.0	99.9	100.1

* It is impossible to make an accurate breakdown for the 1870 to 1910 decades.

* This figure is made up of railroad- and car-shops operatives, 64,573; railroad- and car-shops mechanics, 21,847; apprentices in steam railroads, 1,323.

Railroad workers were 1.23 per cent of all gainful workers in 1870. They became more important in the national labor force in the successive decades until 1890, remained fairly constant through 1900, and by 1910 showed a decided increase, an increase which they held through 1920. A small decrease occurred by 1930.

The reader is directed to the numbers in each of the sixteen

TABLE 198

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
ON STEAM RAILROADS, 1910-1930*

Group	1910	1920	1930
Officials and Superintendents	2 ...	41 .4	21 .3
Foremen and Overseers	222 4.0	66 .6	50 .8
Ticket and Station Agents	1,208 21.8	2,261 20.0	1,790 28.3
Baggagemen and Freight Agents	5 .1	30 .3	16 .3
Inspectors	136 2.5	46 .4	13 .2
Conductors			
Locomotive Engineers			
Locomotive Firemen			
Brakemen			
Motormen			
Switchmen and Flagmen	52 .9	558 4.9	289 4.6
Yardmen		3 ...	
Boilerwashers and Engine Hostlers		34 .3	
Car- and Railroad-Shops Operatives	{ 377 6.8	976 8.6	435 6.9
Laborers	{ 3,248 58.5	6,586 58.3	3,111 49.1
Other Occupations	{ 299 5.4	705 6.2	608 9.6
Total	{ 5,549 100.0	11,306 100.0	6,333 100.1

* It is impossible to make an accurate breakdown for the 1870 to 1910 decades.

* Less than .1 per cent.

subgroups for trends during the decades 1910 to 1930. No one group is numerically important enough to determine the trend for all steam-railroad workers. All operating and repair personnel are intimately bound together in a railroad brotherhood, and what affects one affects all, either beneficially or detrimentally. All are faced with the competition of other forms of transportation and communication which, because of superior advantages of speed and mobility, seem destined to take an

TABLE 199

WORKERS IN STEAM RAILROADS: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1870-1930

	1870	1880	1890	1900	1910	1920	1930
Total population .....	.399	.471	.738	.766	1.300	1.245	.984
All gainful workers, male and female.....	1.232	1.357	2.033	2.002	3.133	3.163	2.473
All in Transportation and Communication.	38.194	40.494	42.438	39.963	47.638	43.101	30.209
[Males of]							
All male gainful workers	1.443	1.598	2.448	2.444	3.956	3.946	3.155
All males in Transportation and Communication	38.242	40.544	42.735	40.560	49.701	46.129	32.327
[Females of]							
All female gainful workers .....	.003	.017	.037	.032	.069	.132	.059
All females in Transportation and Communication	9.281	24.587	13.169	6.590	4.809	5.024	2.249

TABLE 200

LABORERS: * PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1910-1930

	1910	1920	
All gainful workers, male and female*.....	1.423	1.130	
All in Transportation and Communication.....	21.636	15.397	10.881
[Males of]			
All male gainful workers	1.794	1.402	1.134
All males in Transportation and Communication...	22.542	16.389	11.622

* Includes construction laborers.

* Numbers of women are so small as to have only minor significance; see Table 198.

increasing number of passengers and a larger amount of freight traffic away from the railroads.

The trends in this direction have continued long enough to indicate definitely the declining importance of the railroads. By 1900 the location and interconnections of the modern railway system had been established, and while the amount of trackage increased until 1916,¹¹ when the maximum of 254,037

¹¹ Malcolm M. Willey and Stuart A. Rice, *op. cit.*, pp. 167 ff.

miles was reached, these additions served primarily to fill out rather than to add to the system already outlined. Even this trackage could not be used profitably, for by 1930 it had declined by 4,985 miles.

The maximum volume of passengers carried on steam railroads was reached by 1920. The relative inflexibility of the labor force on steam railroads—reflecting somewhat the power of the labor unions and their policy of limiting numbers, which operates to their advantage in a period of expanding business by providing more working time at pay and in a period of contracting business by preventing the too rapid elimination of workers—is seen in the comparison of volume of business with workers. “Passenger miles”¹² increased 195 per cent from 1900 to 1920, but the number of available railroad workers increased only 45 per cent during that time. “Passenger miles” decreased 43 per cent from 1920 to 1930, but the number of railroad workers declined only 8 per cent.

Steam railroads are not likely soon to be replaced by motor transportation in the field of long-haul freight traffic at least. The number of freight-train miles was 17 per cent less in 1930 than in 1910; but the tonnage, as represented in ton-miles hauled, was 51 per cent greater.¹³ This does not mean that an increase in the number of trainmen has resulted, however. On the contrary, the greater size and tractive power of locomotives, the increased average length of freight trains, larger freight cars, bulk shipment of freight such as automobiles, mechanical facilities for handling heavy objects, and modern signaling devices have added greatly to the work output of railroad employees. Thus, the volume of freight traffic handled by Class 1 roads in 1930 was 13 per cent greater than in 1922, but the number of railroad men used in transporting this larger amount had decreased 8.2 per cent and the total wages paid were 3.4 per cent less than in 1922.¹⁴ Even so, it is estimated that the present volume of traffic (1938) could be moved by two-thirds of the

¹² Malcolm M. Willey and Stuart A. Rice, *op. cit.*, p. 169. “Passenger miles” is recognized as the best index of railroad travel, being based upon the number of passengers carried one mile. Not all railroad workers are engaged in passenger business, nor is all of railroad business confined to passenger traffic; but comparable figures were not available for freight traffic. The problem is consequently rather more suggested than solved, especially as the total labor force is not identical with that which is found employed.

¹³ *Statistics of Railways in the United States*, Operating Statistics, Interstate Commerce Commission, 1930, p. S-9.

¹⁴ *Commerce Yearbook*, 1931, United States Department of Commerce, I, 584-85.

present employees, were the full advantages taken of technological advances.¹⁵

Railway workers are subject to frequent, and sometimes prolonged, layoffs. If the average employment for the period 1923-25 is taken as an index at 100,¹⁶ the average for 1930 was 83.3, indicating a total reduction in employment of 16.7 per cent. In the trough of the depression, 1933, the decline in employment as compared with 1923-25 was 45.6 per cent; and in the postdepression recovery of 1935 it still remained at 44.3 per cent of 1923-25. The total man-hours worked in 1936 were 51.5 per cent less than in 1916, but average man-hour output increased 80.9 per cent in those twenty years.¹⁷ Many persons among this unused labor force still appear in the census as railroad workers, although they are probably permanently displaced either by technological advances which have been made to save labor costs or by the loss of passenger business which prevents the re-establishment of railroading on the same extensive basis which prevailed during the heyday of the industry from 1900 to 1920.

The outlook for the future is that railroads will seek an increasing volume of business in the hauling of freight, and in long-haul passenger traffic, and that both will be speeded up considerably by the scrapping of old equipment and the installation of many modern improvements. The average speed of freight trains today is only 16 miles an hour; but even this represents a gain of nearly 50 per cent from the 11 miles per hour of ten years ago. It is possible, as Leonard points out,¹⁸ with better rolling stock and certain technological changes in operation, to speed the movement of freight up to 30 miles an hour. This gain of almost 100 per cent would put factories and farmers only half as far away from their raw supplies and markets as they now find themselves. The cost of freight, an appreciable item in the total cost of any transported product, would be greatly reduced, with widespread benefits to all producers and consumers.

In the business of transporting the commuting public from

¹⁵ X. X. Broadus and Louise Mitchell, *Practical Problems in Economics*, Henry Holt & Co., New York, 1938, p. 372.

¹⁶ *Bulletin No. 816*, Bureau of Labor Statistics, 1936 edition, p. 144.

¹⁷ Witt Bowden, "Productivity, Hours, and Compensation of Railroad Labor, 1933-36," *Monthly Labor Review*, July 1937, p. 3.

¹⁸ Jonathan N. Leonard, *Tools of Tomorrow*, Viking Press, New York, 1935, pp. 208-9.

congested cities to their suburban homes the steam and electric railroads will probably maintain their dominant position for some time to come. But even here many improvements are impending to make the system operate with more dispatch. While it is not likely that all of these improvements will be immediately effective, there will undoubtedly be a tendency to reduce considerably the number of workers required to man the facilities. Consequently, in terms of man power, the 1930 supply would seem to be more than ample, and when the railroad system has been transformed and fitted into its place in our modern high-speed economy it is likely that considerably fewer workers will be used than now comprise the total gainfully employed in steam railroads.

Street Railroads (Tables 201 to 204)

The census permits a separate treatment of workers on street railways only since 1910. Before that time all such workers were grouped under a single caption. From a mere handful of workers, only 5,103 in 1870, the number in the street-railroad force increased to a maximum of 177,146 in 1920, and declined to 149,831 in 1930. In 1930 they were .3 per cent of all workers and 3.7 per cent of the Transportation and Communication group.

As towns and cities developed in the United States the omnibus, an adaptation of the stagecoach, was used to transport passengers from one part of the city to another. However, with the advent of the railroad, the obvious superior speed and capacity to carry a greater number of passengers set an example for city populations which resulted in many attempts to introduce streetcars. One of the most serious difficulties was the problem of the rail;¹⁹ for the raised rail, as used by the steam railroads, was a serious menace to horse-drawn vehicles, which had first place on the city streets. By 1850 the sunken rail was perfected, and there followed in rapid succession a series of different types of horse-drawn cars, both single- and double-deckers, which carried the city traffic until the introduction of electric-driven streetcars in the year 1884. Horse-drawn cars were not fast and for them long journeys were out of the question. The electric-powered streetcar remedied this defect at once, and the

¹⁹ Harold Underwood Faulkner, *American Economic History*, Harper & Brothers, New York, 1924, p. 333.

TABLE 201

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, ON STREET RAILROADS, 1910-1930

Group	1910	1920	
Conductors	56,932 36.1	63,760 36.0	35,697 23.8
Foremen and Overseers	4,673 3.0	6,248 3.5	5,827 3.9
Motormen	56,218 35.7	62,959 35.5	57,969 38.7
Officials and Superintendents	2,433 1.5	3,455 2.0	3,609 2.4
Switchmen and Flagmen	2,153 1.4	2,500 1.4	2,608 1.7
Inspectors	2,268 1.4	3,451 1.9	3,330 2.2
Other Occupations	5,187 3.3	9,259 5.2	13,375 8.9
Laborers (including construction laborers)	27,807 17.6	25,514 14.4	27,416 18.3
Total	{ 157,671 100.0	177,146 99.9	149,831 99.9

TABLE 202

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS ON STREET RAILROADS, 1910-1930

Group	1910	1920	
Conductors	{ 56,932 36.2	63,507 36.0	35,680 23.9
Foremen and Overseers	{ 4,655 3.0	6,236 3.5	5,822 3.9
Motormen	{ 56,218 35.7	62,939 35.7	57,964 38.8
Officials and Superintendents	{ 2,433 1.5	3,445 2.0	3,604 2.4
Switchmen and Flagmen	{ 2,153 1.4	2,496 1.4	2,608 1.7
Inspectors	{ 2,265 1.4	3,445 2.0	3,325 2.2
Other Occupations	{ 5,147 3.3	9,088 5.2	13,242 8.9
Laborers (including construction laborers)	27,602 17.5	25,046 14.2	27,143 18.2
Total	{ 157,405 100.0	176,202 100.0	149,388 100.0

TABLE 203

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
ON STREET RAILROADS, 1910-1930

Group			
Conductors	{ ...	253	17
	{ ...	26.8	3.8
Foremen and Overseers	{ 18	12	5
	{ 6.8	1.3	1.1
Motormen	{ ...	20	5
	{ ...	2.1	1.1
Officials and Superintendents	{ ...	10	5
	{ ...	1.1	1.1
Switchmen and Flagmen	{ ...	4	
	{ ...	.4	
Inspectors	{ 3	6	5
	{ 1.1	.6	1.1
Other Occupations	{ 40	171	133
	{ 15.0	18.1	30.0
Laborers (including construction laborers)	{ 205	468	273
	{ 77.1	49.6	61.7
Total	{ 266	944	443
	{ 100.0	100.0	99.9

TABLE 204

WORKERS ON STREET RAILROADS: PERCENTAGE OF TOTAL POPULATION, OF ALL
GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION
AND COMMUNICATION, 1870-1930

Base	1870	1880	1890	1900	1910	1920	
Total population .....	.013	.023	.060	.091	.171	.168	.122
All gainful workers, male and female*....	.041	.067	.165	.237	.413	.426	.307
All in Transportation and Communication	1.265	2.005	3.437	4.731	6.280	5.801	3.747
[Males of]							
All male gainful workers .....	.048	.079	.199	.290	.523	.533	.392
All males in Transpor- tation and Commu- nication	1.267	2.010	3.471	4.813	6.572	6.229	4.019

* The numbers and percentages of women are negligible; see Table 203.

result of its introduction was very quickly noticeable, as indicated²⁰ in the following figures:

Character of Power	Miles of Track		Percentage Change 1902 over 1890
	1890	1902	
Electric	1,261.4	21,907.5	+1,636.0
Animal	5,661.4	259.1	-95.4
Cable	488.3	240.6	-50.7
Steam	711.3	169.6	-76.2
Total	8,122.4	22,576.8	+177.9

The advent of this new and efficient kind of transportation for urban and suburban areas coincided, in point of time, with the remarkable population growth of our cities and industrial centers, in developing which it had a most important part. However, after the turn of the century, and especially since 1910, the introduction of the automobile, which possessed the great advantages of readiness and convenience together with even more speed, forced the electric railways to face powerful competition. By 1922 the maximum traffic for electric lines was attained, maximum total earnings were recorded, and the greatest number of available workers was listed.²¹ The decline which set in after that year has been continuous. The aggregate number of passengers carried by urban and interurban electric railways declined 14 per cent in the eight years from 1922 to 1930. This does not begin to tell the whole story, however, for in metropolitan areas underground and overhead systems gained in passengers as cities increased in population, and the interurban electric trains feeding these cities also experienced additions to their passenger lists. But in smaller towns, and in some parts of cities, electric railways abandoned their franchises and removed their rolling stock entirely. At the same time, in both large and small cities and in suburban areas, the bus systems, frequently subsidiaries of the electric systems, were increasing their patronage.

Moreover, the rapid increase of private automobiles, as indicated in surveys of traffic, shows that the automobile, more than any other means of transportation, has been responsible for the continuous decline in electric-railway patronage. Rather than give up the convenience and speed which the automobile provides, we are altering many of our national habits. Little hope is indicated for a revival of electric street-railway traffic, but there is considerable probability that motorized street transportation will continue to supplant existing electric lines.

²¹ Malcolm M. Willey and Stuart A. Rice, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 180-81.

In 1936 (July) *Fortune* reported that 430 cities ranging from 10,000 to 250,000 in population had completely abolished trolleys and over 43 per cent of all United States cities having transportation facilities were all-bus cities. Since 1922 the number of electric street-railway companies had declined from 853 to 470, miles of single track from 43,000 to 26,000, trolleys from 74,000 to 41,000, and passengers carried from over 13 billions to around 8 billions. Forty-five per cent of mass surface transportation of the largest city in the United States (New York) is now handled by busses.

For the labor force used in street railways, these facts and prophecies are gloomy indeed. First, in the attempt to reduce costs of operations and effectively compete with busses or privately owned automobiles the electric lines adopted one-man cars in which the motorman serves also as conductor. This fact is reflected in the figures, where motormen have not declined nearly as rapidly as conductors. Officials and business members of the street-railway system have grown in number despite the changed conditions, again attesting the need for more supervision during these trying times of transition. As rolling stock grows old, or changes are made to other types of equipment, more workers have been required for installations and repairs. But, on the whole, it is likely that before the industry levels off to a more permanent though somewhat lower plane further decreases will be made in the number of street-railway workers.

Water Transportation (Tables 205 to 207)

In 1930, there were 180,111 persons, or .51 per cent of all transportation and communication workers, in water transportation.

River and harbor boatmen, who numbered 5,643, were 3.1 per cent of all water-transportation workers in 1930; they had declined considerably from their maximum in 1920 to approximately the same number as were available in 1910. This condition attests the development of duplicate forms of transportation, both land and air, which have eliminated ferries and river boats. Pleasure craft of many kinds have increased in number, however, and the extension of recreational facilities will probably offset the reduction in commercial river and harbor traffic. In these changes the character of occupations will probably shift greatly, with ferrymen actually displaced and workers added to the crews of pleasure craft.

TABLE 205

NUMBER AND PERCENTAGE OF GAINFUL WORKERS IN WATER
TRANSPORTATION, 1910-1930

Group	1910	1920	
MALE AND FEMALE			
Boatmen, Canalmen, and Lock Keepers	5,304 3.5	6,319 3.5	5,643 3.1
Captains, Masters, Mates, and Pilots ..	24,242 15.8	26,320 14.7	24,485 13.6
Longshoremen and Stevedores	62,857 41.0	85,928 47.9	73,954 41.1
Sailors and Deck Hands	46,510 30.4	54,832 30.6	64,700 35.9
Laborers*	14,267 9.3	5,966 3.3	11,329 6.3
Total	{ 153,180 100.0	{ 179,365 100.0	{ 180,111 100.0
MALE			
Boatmen, Canalmen, and Lock Keepers	{ 5,289 3.5	{ 6,286 3.5	{ 5,603 3.1
Captains, Masters, Mates, and Pilots ..	{ 24,242 15.8	{ 26,318 14.7	{ 24,482 13.6
Longshoremen and Stevedores	{ 62,813 41.0	{ 85,605 47.8	{ 73,944 41.1
Sailors and Deck Hands	{ 46,498 30.4	{ 54,800 30.6	{ 64,692 35.9
Laborers*	{ 14,177 9.3	{ 5,963 3.3	{ 11,327 6.3
Total	{ 153,019 100.0	{ 178,972 99.9	{ 180,048 100.0
FEMALE			
Boatmen, Canalmen, and Lock Keepers	{ 15 9.3	{ 33 8.4	{ 40 63.5
Captains, Masters, Mates, and Pilots ..	{	{ 2 .5	{ 3 4.8
Longshoremen and Stevedores	{ 44 27.3	{ 323 82.2	{ 10 15.9
Sailors and Deck Hands	{ 12 7.5	{ 32 8.1	{ 8 12.7
Laborers*	{ 90 55.9	{ 3 .8	{ 2 3.2
Total	{ 161 100.0	{ 100.0	{ 63 100.1

* Not otherwise specified.

The available number of captains, masters, mates, and pilots of vessels of all descriptions operating under American registry totaled 24,485 in 1930, or 13 per cent of all water-transportation workers. They were fewer in number in 1930 than in 1920 and about the same in number as were in water trans-

TABLE 206

WORKERS IN WATER TRANSPORTATION: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.231	.177	.123	.103	.167	.170	.147
All gainful workers, male and female*....	.712	.509	.338	.270	.401	.431	.369
All in Transportation and Communication.	22.065	15.188	7.058	5.382	6.102	.874	.505
[Males of]							
All male gainful workers .....	.834	.600	.408	.329	.509	.541	.473
All males in Transportation and Communication	22.091	15.225	7.125	5.468	6.389	.327	.844

* The numbers and percentages of women are negligible; see Table 205.

portation in 1910. Their comparatively stationary figures correspond to the increases and decreases in number of vessels under registry for these years, as shown in Table 207. The unemployment among masters and mates is marked, especially since 1929, with many vessels out of commission and tied to their moorings. Even more noticeable, the decline in number of vessels and total tonnage in 1935, as compared with the peak of 1920-21, was 3,093 vessels and 3,628,136 gross tons.²² This declining trend continued all through the postwar prosperity period of the 1920's and during the depression years following 1930. However, by 1939 the situation had altered notably. On March 27 of that year *Life* was able to report as follows:

In 1938 over 80 per cent of the seagoing merchant ships of the nation were rapidly becoming obsolete. But a notable change in the situation has recently come about. In seven shipbuilding yards 51 new ships are being constructed by the United States Merchant Marine Commission. An equal number will be built every year for a ten-year period. By 1947 the merchant marine will have five million tons of new shipping. This is in addition to the billion-dollar building program of the Navy, the biggest in 20 years.

In 1930 sailors totaled 64,700 and were 36 per cent of all water-transportation workers. Their number, as recorded by the census, has increased rapidly since 1910, with approximately 10,000 more sailors listed in 1930 than in 1920. Most sailors were engaged in ocean and lake traffic; for river ton-

²² *Statistical Abstract of the United States*, 1921, p. 409, and 1936, p. 408.

nage reached its peak long before the turn of the century. Of the 4,633 miles of canals built in the United States before 1909, over half had been abandoned by 1924.²³ The trend for sailors in the census list does not correspond with the figures on number of vessels for the reason that there is no close agreement between number of available sailors and number required to man the ships of the merchant marine. (Sailors in the United States Navy are listed in "Public Service" by the census.) Sailors are notorious for irregularity of employment; either through design or because of the circumstances of their life and work, they do not remain continuously at sea. Census enumeration of sailors is not entirely accurate, because of the difficulties involved in securing necessary information from this highly mobile population. In 1909, the number of seamen shipped, reshipped, and discharged from ships totaled 341,980, when, as a matter of fact, there were actually less than 47,000 American seamen.²⁴ An excess of sailors in comparison with berths has been noted by all competent observers, but its extent, while agreed to be large, is not accurately known.

In this connection, a crude measure of comparison is furnished by the increased freight tonnage handled by American ships in 1930 as compared with 1920. The increase in freight was 33 per cent; but the increase in available force of seamen was 18 per cent.²⁵ When it is considered that only a part of this available force of seamen actually is employed in manning freight vessels, it can readily be seen that the working efficiency of seamen has been greatly increased. This is a factor also in reducing the demand for labor at sea, and one which will be more in evidence as the new ships, recommended by the Kennedy report, are built and put into commission, thereby displacing labor-using old hulks.

Longshoremen and stevedores are required to handle freight at the docks, loading and unloading vessels. They not only serve the American merchant marine, but also are employed to discharge the cargoes of foreign vessels which either unload or transship freight in American ports. Their number totaled 73,954 in 1930, which was considerably below their peak

²³ Harold Underwood Faulkner, *American Economic History*, Harper & Brothers, New York, 1924, p. 480.

²⁴ *Annual Report of the Commissioner of Navigation, 1909*, p. 446. Reports of United States Departments of Commerce and of Labor, 1909.

²⁵ Figures on freight hauled in short tons taken from the *Annual Report of the Chief of Engineers, United States Army*, Part 2, 1930, p. 4; same report for 1935, Part 2, Table No. 1. Increase in number of sailors computed from the census figures.

number in 1920 but was measurably above the 1910 number. During the past twenty years, a great transformation has taken place on the water fronts of the nation. Goods were formerly hauled and trucked by hand, or on carts drawn by men or animals. Now electric cranes, larger hoists, rubber-tired, power-driven trucks, electric "pushers," motor vans, and other devices have greatly speeded up the handling of freight. Many of these changes have taken place within the last few years as the financial situation of the merchant marine has required adjustment of labor costs. All these changes affect the number of longshoremen required, and only a very large increase in volume of freight entering and leaving American ports can prevent the decline in number of longshoremen noted during the past ten years from becoming permanent.

How the amount of freight handled has compared with the number of longshoremen available can be seen in Table 207.

TABLE 207

NUMBER OF VESSELS, GROSS TONNAGE, TONS OF FREIGHT HAULED, AND NUMBERS OF SAILORS, LONGSHOREMEN, AND CAPTAINS AND MATES, 1910-1930*

	1910	1920	Change, 1930 over 1910	
Number of vessels	25,740	28,183	25,214	- 526
Percentage change		+ 9.5	-10.5	- 2.0
Gross tonnage of vessels (000 omitted) ..	7,058	16,324	16,068	9,010
Percentage change		+131.3	- 1.6	+127.6
Tons of freight hauled (000 omitted)		399,000	520,280	
Percentage change			+30.4 ^a	
Number of sailors ^b	46,510	54,832	64,700	18,190
Percentage change		+ 17.9	+18.0	+ 39.1
Number of longshoremen ^c	62,857	85,924	73,954	11,097
Percentage change		+ 36.7	-13.9	+ 17.6
Number of captains and mates ^d	24,242	26,320	24,485	243
Percentage change		+ 8.6	+ 7.0	+ 1.0

* Data on number and tonnage of vessels taken from *Statistical Abstracts of the United States*: "Tonnage of Merchant Marine," 1921, p. 409, and 1930, p. 408. Data on freight carried, taken from the *Annual Report of the Chief of Engineers, United States Army*, Part 2, 1931. Labor-force figures taken from Table 204, above.

^a Based on 1930 over 1920.

^b Deckhands are included with sailors.

^c Stevedores are included with longshoremen.

^d Masters and pilots are included with captains and mates.

Certain significant years are not included in this table. For example, the largest number of vessels listed was in 1920, but the greatest tonnage of vessels was in 1921, and both declined

steadily thereafter. The greatest freight tonnage carried was in 1929; since then the decline has been continuous, 1934 being 29 per cent below that year. In 1926, the highest record was made for value of all freight shipped, following that year the decline has been marked, reaching 45 per cent by 1934.

American shipping competes with foreign vessels from many countries, all of which have much lower labor standards and pay. In any freely competitive market, the American merchant marine is at a serious disadvantage. In 1860 the percentage of all imports and exports carried in American bottoms was 66; in 1870 it had declined to 35; by 1900 it was only 9 per cent; but in 1930 it was 11 per cent.²⁶ These are some of the facts which reveal a merchant marine facing grave problems which threaten its survival as an American industry. Only because of the government sale of ships to private companies on most generous terms, government subsidies for mail contracts, and cash for operating costs granted merchant vessels with the understanding that they form the auxiliary force of the nation in case of war, was the American merchant marine able to survive during this period.

An American ship costs on the average 25 per cent more to build than a ship built in England, and this adds materially to the overhead charges required to liquidate her cost. Officers of an American ship receive relatively 30 per cent higher pay than foreign officers.²⁷ The law provides that 75 per cent of an American vessel's crew must understand any order given by its officers, that 64 per cent of the deck crew must be able seamen who have qualified by passing physical and professional examinations, that half pay be given to crews during their stay in port, and that the crew has the right to quit the service at any time the vessel touches an American port.

It is highly improbable that the American merchant marine will again assume a place of great importance in world shipping until drastic changes are made. Manifestly it is not reasonable to expect officers and men who are even now not highly compensated to accept greatly reduced salaries and wages. Nor is it easy to effect substantial savings in capital costs and overhead, although the reorganization proposed by the Kennedy report seeks to do so. It is probable that the merchant

²⁶ Harold Underwood Faulkner, *op. cit.*, p. 672; also *Statistical Abstract of the United States*, 1932, p. 425.

²⁷ Harold Underwood Faulkner, *op. cit.*, also *Annual Report of the United States Shipping Board*, "Handicaps of American Shipping," June 1923, pp. 5 ff.

marine can continue to exist only as in the past, by government grants of substantial loans and cash subsidies. In the period of financial readjustment, the junking of obsolete vessels and the building of ships of greater tonnage and proportionately less costly to operate, the government participation in the water-transportation industry will be greater than in the past. Whether it will ever be able to release its hold on the industry or will eventually come to control and operate it are serious questions for the future to decide. These issues will obviously affect the labor force engaged in water transportation in many ways. With government control, the merchant marine would become a national labor force subject to the discipline of government bureaus. As it is, workers on the water front and ships are free agents in a competitive labor market.

It is probable that, except in case of national emergencies, the government will continue to subsidize the merchant marine and to permit private firms to conduct the water-transportation business. Under these conditions, it is possible that the better-regulated merchant marine of the near future will require a smaller labor force than that of 1930.

Air Transportation

Persons engaged in air transportation were segregated for the first time in the census of 1920. Commercial flying was in its infancy at that time, and only aviators were listed separately, numbering 1,312. Even in 1930, this new form of commerce, while it had made rapid strides, engaged the attention of only 12,383 workers, most of whom were aviators and mechanics. The Air Transportation group was only .025 per cent of the total of the gainfully employed, and the decennial increase, while substantial, added only 11,071 workers to this field of transportation. (See Tables 184, 185, and 186.)

According to Table 208, the number of licensed pilots advanced more than 14,000 from 1927 to 1936, although from 1930 to 1936 no appreciable increase was noted. Many of these licensed pilots had fulfilled the requirements to obtain their licenses, but were not actually employed in air transportation.

The figures for number of passengers carried and miles flown indicate the rapid advance of the airplane as a means of transportation. The great depression and the manufacture of larger planes reduced the number of pilots and mechanics, as well as the number of airplanes manufactured, but they did not

TABLE 208

NUMBER OF LICENSED AIRPLANES, PILOTS, MECHANICS, AIRPLANES MANUFACTURED, PASSENGERS CARRIED BY AIR LINES, PASSENGER MILES FLOWN, AND AVERAGE WAGES PAID TO ALL ACTIVE EMPLOYEES, 1927-1936*

	1927	1930	1933	1936	Change, 1936 over 1927
Licensed airplanes	1,908	7,354	6,896	7,424	+ 5,516
Licensed pilots	1,572	15,280	13,960	15,952	+ 14,380
Licensed mechanics .....	....	8,993	8,226	8,738	- 255
Airplanes manufactured	1,995	3,437	1,324	3,010	+ 1,015
Passengers carried by air lines	8,679	417,505	568,940	1,147,969	+1,139,290
Passenger miles flown (in million miles) .....	....	103.7	198.8	491.7	+ 388.0
Average pay (all workers) ...	....	\$2,681	\$2,213	....	- \$468

* *Civil Aeronautics in the United States*, United States Department of Commerce, Bureau of Air Commerce, Aeronautics Bulletin No. 1, August 1937, pp. 8 ff. See also, *National Income in the United States, 1929-35*, United States Department of Commerce, p. 139. Figures for 1937 are as follows: passengers carried, 1,267,580; passenger miles flown, 549,628,407; express and freight carried, 8,914,067 pounds (D. P. Locklin, *Economics of Transportation*, revised edition, 1938, p. 820).

prevent an increase in the use of the airplane by commercial companies, for both the number of miles flown and the number of passengers increased even during the depression. Much of the curtailment of workers and planes was caused by the reduction in private flying. Other forms of transportation have not been seriously threatened by commercial airplanes, for by 1933 airplanes carried only 1.0 per cent of all passenger traffic in the United States.²⁸ Unfortunately, a full series of figures is not available on average wages paid to all workers actively employed in the commercial airplane passenger and mail service. It is interesting to note that in 1929 this average wage was \$3,075 and that it declined as commercial flying increased in amount until in 1934 it averages only \$2,378.²⁹ Even so, the average airplane employee was paid considerably more than was the average worker in any other form of transportation, the nearest competitor being the salaried worker employed on steam railroads, who received \$1,943 per annum in 1934.

It is difficult to predict the future of commercial air transportation in terms of the number of workers who will be required. That the field will expand is the consensus of experts.

²⁸ *Civil Aeronautics in the United States*, United States Department of Commerce, Aeronautics Bulletin No. 1, August 1937. See later bulletins for further advances.

²⁹ *National Income in the United States, 1929-35*, United States Department of Commerce, p. 139.

But because of technical difficulties, the cost of airplanes, the hazard, and the public attitude toward flying, it is probable that commercial flying will continue to appeal primarily to persons to whom the saving of time is a first consideration. However, both the number of passengers and the number of passenger miles increased greatly in each three-year period quoted in Table 208. Moreover, inventions now receiving practical tests and others that are well along toward perfection may very well alter the character of the airplane so as to make vertical landing possible, reduce the original cost and upkeep considerably, and eliminate many of the present hazards of flight. When these changes are made it is highly probable that the use of both commercial and private airplanes will be widespread.

From 1918 to 1926 the development of civil air transportation was influenced greatly by the air mail conducted by the federal government. Our modern American mail service was begun in 1911, when the first American air mail was flown on a regular schedule from Nassau Boulevard on Long Island to Mineola, New York. But the first air-mail route was not established until 1919. With the issuance of mail contracts to private companies in 1927, a new stage of development in this infant industry was reached which probably accounts for the rapid advances made.³⁰ No less important have been the experiments of the government with airplanes and their use in connection with military and naval preparedness. The combined efforts of government and civil groups have resulted in charting the airways, providing for an increased number of excellent landing fields, and improvement in the use and safety of the airplanes themselves. The paramount improvement of all is the one made in the requirements for technical qualifications of pilots and mechanics; they must now pass rigorous and frequent tests in order to achieve and maintain occupational status.

The NYA of California in 1939 published a monograph on the aircraft industry in California from which the following quotations have been made.³¹

The period just before the World War was a stagnant one in the development of planes. However, the first period of war preparations served as an impetus to the industry and resulted in many innovations.

³⁰ *Air Commerce Bulletin*, United States Department of Commerce, May 15, 1938, Vol. IX, No. 11, pp. 267-69.

³¹ *An Occupational Study of the Aircraft Manufacturing Industry in California*, NYA of California, 1939, Preface and pp. 2, 3.

.... After the war, many small aircraft companies sprang into existence, and public interest in aviation ran high. The planes of this era were still made almost entirely of wood and fabric.

Developments continued rapidly and by 1925 fuselages were being streamlined to some extent; steel welded frames were being used in fuselages, tail surfaces, and landing gears. The numbers of wires and struts on biplanes were being reduced; nuts, bolts, and turnbuckles were being standardized and made from heat treated nickel steel; and radial aircooled engines were being used in place of the old style water-cooled type. Although many of the factories did a yearly business of over a million dollars, only two of them had been financed publicly. In the boom year of 1929, many of the smaller firms decided to follow suit, with the result that within a year or two the large number of independent small plants had given way to a few big organizations.

Every year showed more standardization of parts, and an increased number of instruments. In the last ten years such great advances have been made that few of the production materials previously used could stand the strain developed in present planes. The demand of the purchasing public for increased power and speed at lower operating costs has been chiefly responsible for many of these new developments.

Today, although the value of production has increased over 350 per cent from 1927 (\$25,805,532 in 1927 to \$114,992,863 in 1937) there are only about 100 plants whose chief products are airplanes, engines or accessories. In the first six months of 1938 these plants produced 837 planes for private use, 93 for transport use, and 711 for military use. These production figures show an increase of 22 per cent over the figures for the same period in 1937. Most of the increase was in military production, for it alone showed an increase of 173 per cent; the export increase was 49 per cent; whereas the number of planes for domestic civil use decreased 21 per cent.

Aircraft manufacture is one of the largest industries in California, and California is one of the largest centers of the industry in the United States. There are a total of thirteen plants in the state employing approximately 17,500 workers.

The aircraft manufacturing industry is a rapidly growing and changing one. Although the industry is ever progressing and changing, most manufacturing and processing operations require from one to five years for proper development.

.... four aircraft corporations employ approximately 65 per cent of the aircraft workers in the state. The plants are located in Burbank, Downey, Inglewood, and San Diego.

With all these events occurring in rapid succession, it is little wonder that many persons look to the airplane to create that new widespread industry which will greatly increase the speed of transportation and offer gainful employment to a substantial body of workers. Up to the present time this infant industry, while promising, has not fulfilled such anticipations. Even in 1929, when more airplanes were manufactured than at any time prior to that date, the total average number of wage earners employed in airplane factories was only 14,710, which, when combined with pilots and mechanics, made a total of only

36,344 persons in the labor force engaged in the manufacturing and operation of airplanes. This was only .07 per cent of the national labor force.

Obviously, revolutionary changes comparable in extent to those which occurred in the automobile industry would have to take place if the airplane is to become the basis of a new industrial advance. It is far more likely that whereas the immediate future will witness some substantial gains in number of airplanes in use and number of workers required to operate them no phenomenal increases will occur to upset the present trend or the composition of the national labor force.²²

Communication (Tables 209 to 212)

Not only as an economic and social necessity but also as a user of labor the communication system of the nation is of primary importance. In 1930, there were 663,267 persons listed in this branch of our economy; they were 1.35 per cent of the total gainfully employed and 16.6 per cent of all transportation and communication workers. Their number has grown rapidly in each successive decade. Some of the increase noted in the summary tables taken from the census, especially the great advance to new high levels from 1900 to 1910, is due to reclassifications which permitted separate groupings under the caption "Communication" of many workers who were either too recent on the occupational horizon or of insufficient numerical importance to be treated separately before that time. A considerable part of the decennial increases, however, represent new-born industries and their demands for labor, especially following the invention and practical introduction of the telephone toward the close of the last century.

By dividing the history of communication into two periods, namely, that prior to the introduction of the telephone and that following its introduction, it appears that the gain in number of communication workers was 81,423 in the thirty years before 1900, whereas 573,528 new communication workers were added in the thirty years between 1900 and 1930. From only .3 per cent of the national labor force in 1900, communication workers in 1930 comprised 1.35 per cent of that body.

²² For additional material relating to conditions in 1938, occupations, qualifications, working conditions, etc., see "Air Transportation," Revised, *Occupations: A Series of Vocational Studies*, NYA of Illinois, Chicago, June 15, 1938. See also *Vocational Analysis of Certain Branches of Aviation*, NYA of Wisconsin, Madison, Wisconsin, July 21, 1937.

TABLE 209

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN COMMUNICATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Postmasters .....	{ ....	....	....	....	27,849	31,935	34,421
	{ ....	....	....	....	7.5	6.2	5.2
Mail Carriers .....	{ ....	....	....	....	80,678	91,451	121,838
	{ ....	....	....	....	21.8	17.8	18.3
Radio Operators .....	{ ....	....	....	....	....	....	4,955
	{ ....	....	....	....	....	....	.7
Telegraph and Telephone Proprietors, Managers, and Officials .....	{ ....	....	....	....	10,089	11,603	18,957
	{ ....	....	....	....	2.7	2.3	2.9
Foremen and Overseers,* Telegraph and Telephone .....	{ ....	....	....	....	3,843	6,822	11,172
	{ ....	....	....	....	1.0	1.3	1.7
Telegraph and Telephone Inspectors .....	{ ....	....	....	....	2,619	2,821	4,173
	{ ....	....	....	....	.7	.5	.6
Telephone and Telegraph Operators	{ 8,316 ^b	23,166 ^b	52,214	74,982	167,846	269,594	317,207 ^c
	{ ....	....	82.4	83.6	45.5	52.5	47.8
Telegraph Messengers .....	{ ....	....	....	....	9,152	9,403	16,176
	{ ....	....	....	....	2.5	1.8	2.4
Telegraph and Telephone Linemen .....	{ ....	....	11,184 ^d	14,757	28,850	37,917	71,625
	{ ....	....	17.6	16.4	7.7	7.4	10.8
Laborers,* Telegraph and Telephone .....	{ ....	....	....	....	5,312	5,088	12,674
	{ ....	....	....	....	1.4	1.0	1.9
Laborers,* Pipe Lines .....	{ ....	....	....	....	2,605	7,369	13,704
	{ ....	....	....	....	.7	1.4	2.1
Express Messengers and Railway Mail Clerks ....	{ ....	....	....	....	22,021	25,005	25,606
	{ ....	....	....	....	6.0	4.9	3.9
Agents, Express Companies .....	{ ....	....	....	....	5,875	5,293	4,176
	{ ....	....	....	....	1.6	1.0	.6
Laborers,* Express Com- panies .....	{ ....	....	....	....	3,010	9,069	7,086
	{ ....	....	....	....	.8	1.8	1.1
Total	{ 8,316	23,166	63,343	89,739	369,249	513,390	663,297
	{ 100.0	100.0	100.0	100.0	99.9	99.9	100.0

* Not otherwise specified.

^b Estimated.

^c Includes 502 apprentices.

^d Includes electric light and power company employees.

Communication workers were segregated into 12 subgroups by the census in 1930, the major divisions being as follows:

Type of Communication	Percentage of Workers
Mail (United States)	23.5
Radio .....	.7
Telephone and Telegraph	70.2
Express (including railway mail clerks)	5.6
Total	100.0

TABLE 210

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN COMMUNICATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Postmasters .....	{ ....	....	....	....	19,127	20,727	20,818
	{ ....	....	....	....	7.3	6.8	5.3
Mail Carriers .....	{ ....	....	....	....	79,667	90,181	120,204
	{ ....	....	....	....	30.5	29.6	30.6
Radio Operators .....	{ ....	....	....	....	....	....	4,909
	{ ....	....	....	....	....	....	1.3
Telegraph and Telephone Proprietors, Managers, and Officials .....	{ ....	....	....	....	8,680	11,059	16,084
	{ ....	....	....	....	3.3	3.6	4.1
Foremen and Overseers,* Telegraph and Telephone .....	{ ....	....	....	....	3,439	6,797	11,112
	{ ....	....	....	....	6.3	2.2	2.8
Telegraph and Telephone Inspectors .....	{ ....	....	....	....	2,485	2,491	3,040
	{ ....	....	....	....	1.0	.8	.8
Telephone and Telegraph Operators	{ 7,961	21,891	43,740	52,426	71,365	74,355	65,324
	{ ....	....	80.7	78.0	27.4	24.5	16.6
	{ ....	....	....	....	9,074	8,969	15,997
	{ ....	....	....	....	3.5	3.0	4.1
Telegraph Messengers .....	{ ....	....	....	....	....	....	....
	{
Telegraph and Telephone Linemen .....	{ ....	....	10,465	14,757	28,347	37,905	71,624
	{ ....	....	19.3	22.0	10.9	12.5	18.2
Laborers,* Telegraph and Telephone .....	{ ....	....	....	....	5,251	5,011	12,647
	{ ....	....	....	....	2.0	1.6	3.2
Laborers,* Pipe Lines .....	{ ....	....	....	....	2,605	7,362	13,700
	{ ....	....	....	....	1.0	2.4	3.5
Express Messengers and Railway Mail Clerks ....	{ ....	....	....	....	22,018	24,996	25,600
	{ ....	....	....	....	8.4	8.2	6.5
Agents, Express Companies .....	{ ....	....	....	....	5,904	5,193	4,102
	{ ....	....	....	....	2.2	1.7	1.0
Laborers,* Express Com- panies .....	{ ....	....	....	....	2,979	9,067	7,085
	{ ....	....	....	....	1.1	3.0	1.8
Total	{ 7,961	21,891	54,205	67,183	260,841	304,063	392,697
	{ 100.0	100.0	100.0	100.0	99.9	99.9	99.9

* Not otherwise specified.

It appears that slightly less than three-fourths of all communication workers are within the telephone and telegraph fields. Consequently whatever occurs in these fields will decide to a very large extent the trend of events for the entire labor force in communication. But only to the extent that services rendered are common or subject to the same influences will it determine the course of events for each of the subgroups. In fact, it is possible for agencies of communication as dissimilar as the postal service and the telephone to have decidedly different rates of growth and to make entirely different demands upon the labor force. Thus, while it is important to make gen-

TABLE 211

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN COMMUNICATION, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Postmasters .....	{ ....	....	....	....	8,722	11,208	13,803
	{ ....	....	....	....	8.0	5.4	5.0
Mail Carriers .....	{ ....	....	....	....	1,011	1,320	1,129
	{ ....	....	....	....	.9	.6	.4
Radio Operators .....	{ ....	....	....	....	....	....	46
	{ ....	....	....	....	....	....	..^a
Telegraph and Telephone Proprietors, Managers, and Officials .....	{ ....	....	....	....	1,409	544	2,373
	{ ....	....	....	....	1.8	.3	1.1
Foremen and Overseers, ^b Telegraph and Telephone .....	{ ....	....	....	....	404	25	60
	{ ....	....	....	....	.4	... ^a	... ^a
Telegraph and Telephone Inspectors .....	{ ....	....	....	....	134	330	1,133
	{ ....	....	....	....	.1	.2	.4
Telephone and Telegraph Operators	{ 355	1,275	8,474	22,556	96,481	195,239	251,331
	{ ....	....	92.7	....	89.0	93.3	92.9
Telegraph Messengers .....	{ ....	....	....	....	73	434	179
	{ ....	....	....	....	.1	.2	.1
Telegraph and Telephone Linemen .....	{ ....	....	689	....	3	....	1
	{ ....	....	7.3	....	...^a	... ^a	... ^a
Laborers, ^b Telegraph and Telephone .....	{ ....	....	....	....	61	77	27
	{ ....	....	....	....	.1	... ^a	... ^a
Laborers, ^b Pipe Lines .....	{ ....	....	....	....	....	7	4
	{ ....	....	....	....	....	...^a	... ^a
Express Messengers and Railway Mail Clerks .....	{ ....	....	....	....	3	9	8
	{ ....	....	....	....	...^a	... ^a	... ^a
Agents, Express Companies .....	{ ....	....	....	....	71	100	74
	{ ....	....	....	....	.1	... ^a	... ^a
Laborers, ^b Express Com- panies .....	{ ....	....	....	....	31	22	1
	{ ....	....	....	....	...^a	... ^a	... ^a
Total	{ 355	1,275	9,143	22,556	108,408	209,327	270,570
	{ 100.0	100.0	100.0	100.0	100.0	100.0	99.9

^a Less than .1 per cent.^b Not otherwise specified.

eral observations concerning the field of communication taken as a whole, it is essential to scrutinize trends and events within each subfield.

The Postal Service.—The census makes a separate category of the Postal Service group beginning with 1910. The number of mail carriers and the number of postmasters have grown in each successive decade. Post offices with gross revenues exceeding \$1,500 a year have postmasters appointed by the President. These larger offices have increased steadily in number.³³

³³ Malcolm M. Willey and Stuart A. Rice, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 191 ff. Unless otherwise stated, facts presented here have been taken from this very readable account of the postal service.

TABLE 212

WORKERS IN COMMUNICATION: PERCENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL WORKERS IN TRANSPORTATION AND COMMUNICATION, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population .....	.022	.046	.101	.118	.401	.486	.540
All gainful workers, male and female .....	.066	.133	.279	.309	.967	1.234	1.358
All in Transportation and Communication. [Males of]	2.062	3.974	5.816	6.160	14.708	16.812	16.589
All male gainful workers .....	.075	.148	.288	.283	.867	.920	1.031
All males in Transpor- tation and Commu- nication	1.977	3.767	5.027	4.694	10.891	10.749	10.566
[Females of]. All female gainful workers .....	.018	.048	.234	.424	1.342	2.448	2.516
All females in Trans- portation and Com- munication	53.144	70.132	83.498	88.054	93.962	93.045	96.078

Smaller post offices, those of the fourth class, have decreased, however, and this accounts for the total loss in post offices from a peak of 76,945 in 1901 to 49,063 in 1931. As highways and motor transportation become more dependable, and with more mail carriers performing the service of distributing mail which formerly had to be called for at the post office, this diminishing trend is likely to continue.

The expansion of postal business has likewise greatly influenced the growth in number of postal-service workers. In 1908 7,103 million pieces of first-class mail were handled, or 80.5 per capita; by 1930 the number so handled increased to 16,901 million, or 137.9 per capita. The greatest volume of postal matter handled in the United States was in 1929 at the height of business prosperity. In the single subsequent year a decline of 5.8 per cent was noted, which shows how sensitively interwoven this part of the communication system is with the American business structure. Thus business fluctuations appear as one of the dominant factors in determining the need for postal workers.

Rural free delivery began in 1896, and was extended so rapidly that by 1931 almost 9 million of the more than 13 million families living outside of cities were served by rural mail

carriers. There is much yet to be done, however, before mails are carried to all residents of rural areas. City service preceded rural delivery, being established in 1863. It also has been rapidly extended, more than keeping pace with the urbanization of the United States. The air mail was inaugurated in 1918, and since the six-cent rate was established in 1929 the volume of air mail has tripled. In 1931 air mail totaled 87 million pieces, but this was only .5 per cent of all first-class mail handled that year.³⁴ Domestic air-mail routes increased from 4,713 miles in 1927 to 23,488 in 1931.

The handling and transporting of mail has undergone many technological changes, reducing the time required and increasing the output of workers. Postal tubes, automatic canceling devices, more convenient mail-car appliances, which permit of much sorting en route, and the use of specially equipped motor transportation have all played their parts in this speeding-up process. It is probable that such advances will continue to be made and they will have the effect of reducing the number of workers required to handle a given quantity of mail. Offsetting this result of technology must be placed the obvious fact that a more extensive service and increased volume of mail have been responsible for the increase in number of postal employees to date. As there is much territory yet to be covered, and more efficient service yet to be established, it is probable that the public will insist upon extensions of the postal service from time to time, resulting in the employment of more postal clerks. They will continue to be protected in part from the most severe economic disturbances of unemployment during cyclical and seasonal business depressions by the activities of their professional organizations and the weight of political influence, for this service is still somewhat under the dominance of the spoils system.

Radio Operators.—Radio operators were too few to be separately enumerated by the census until 1930. In 1910 and 1920 they were included with telegraph operators. The census enumerated 4,955 radio operators in the United States in 1930—a nucleus of what may well become a substantial group of workers as the wireless becomes more important in communication. In 1930 radio operators made up only .004 per cent of the

³⁴ The volume of air mail carried during 1935 almost doubled that of the preceding year (*World Economic Review*, Bureau of Foreign and Domestic Commerce, 1935, p. 80).

population, .01 of all gainful workers, .12 of all transportation and communication workers, and .7 per cent of all communication workers. This work is confined almost wholly to males; only 46 women were listed in 1930.

Inventions now in the initial stages of commercial development, or still confined to laboratories, bid fair to require the services of an increasing number of radio operators. How many will be needed and how rapidly they will be added to the labor force depends upon factors both technological and commercial about which too little accurate information is now available for any useful forecast to be made.

Telephone and Telegraph Workers.—Of the fourteen occupational groups in communication, six are in the telephone and telegraph industry; the relative importance of each in 1930 was as follows:

Group	Percentage
Telephone and Telegraph Operators.....	72.3
Linemen	16.3
Messengers	3.7
Foremen and Overseers.....	2.5
Inspectors .....	.9
Proprietors, Managers, Officials.....	4.3

Data on telegraph operators are available since 1870 and on telephone and telegraph linemen since 1890, but the other groups have been treated separately in the census only since 1910. The total body of telephone and telegraph workers has increased rapidly since 1870 but more especially since 1900. Each subgroup has likewise increased in size, although the rates of increase have not been identical.

Telegraphy

Commercial telegraph companies operated 23,281 miles of single wire line in 1852, which had increased by 1902 to 1,307,046 miles, and by 1932 had reached 2,259,827 miles. In 1937 the number of miles of single wire was 2,301,532.³⁵ Certain other pertinent information is given in Table 213.

The number of companies declined 18 per cent in the twenty years from 1912 to 1932. The number of telegraph stations declined 15 per cent, but the number of messages sent increased

³⁵ "Telephones and Telegraphs," *Census of Electrical Industries*, 1932, p. 40, and 1937, p. 46.

TABLE 213

NUMBERS OF TELEGRAPH AND CABLE COMPANIES, TELEGRAPH STATIONS,
MESSAGES SENT, EMPLOYEES, TOTAL WAGES PAID, TOTAL
OPERATING REVENUE, 1912-1932*

	1912	1922	Change, 32 cv 1912	
Number of companies	28	25	23	
Percentage change		- 10.7	- 8.0	- 17.9
Number of stations	30,864	27,354	26,034	....
Percentage change .....	....	- 11.4	- 4.8	- 15.6
Number messages sent (millions) ..	109.3	191.1	158.3	....
Percentage change		+ 74.8	-17.2	+ 44.8
Total number of employees	44,811	68,632	66,723	....
Percentage change .....	....	+ 53.2	- 2.8	+ 48.9
Total salaries and wages (millions)	\$24.8	\$ 76.1	\$ 73.9	....
Percentage change .....	....	+206.9	- 2.9	+198.0
Total operating revenue (millions) .	\$60.4	\$146.8	\$114.6	....
Percentage change		+143.0	-21.9	+ 89.7

* "Telephones and Telegraphs," *Census of Electrical Industries, 1932*, p. 38. For 1937 the corresponding figures are: number of companies, 23; number of stations, 25,522; number of messages sent (millions), 218.1; total number of employees, 73,457; total salaries and wages (million dollars), 83.7; total operating revenue (million dollars), 135.8. ("Telephones and Telegraphs," *Census of Electrical Industries, 1937*, p. 43.)

45 per cent, while the total number of employees reached a maximum in 1922 and declined 2.8 per cent by 1932.

Telegraphers have been particularly affected by changes due to inventions. In 1907 a telephone selector made practical the use of telephones for train dispatching, and since then telegraphers have been displaced rapidly. However, the number displaced has not been as great as the introduction of the telephone would have caused if railroad telegraphers had been wholly employed to send and receive messages. Many of them, especially in the smaller places, acted as station agents also and succeeded in retaining their positions although they no longer worked as skilled telegraphers. For this reason statistics on displacement are hard to obtain. A special report of the Department of Labor listed all employees of Class I railroads working as telephone and telegraph dispatchers, assistants, towermen, telegraph clerks, and messengers for the years from 1921 to 1931.⁸⁶ The peak number of such workers was 79,346 in 1923, which declined to 68,661 in 1930. The decline for the ten-

⁸⁶ "Displacement of Morse Telegraphers in Railroad Systems," *Monthly Labor Review*, May 1932, p. 1017. See also "Telephones and Telegraphs," *Census of Electrical Industries, 1937*, p. 47.

year period was 24 per cent. This is a very rough approximation of the amount of displacement caused by changes made in the dispatching and control of trains.

In the field of commercial telegraphy, the introduction of the printer-telegraph operator has caused a remarkable change during the last fifteen years. The effect of the introduction of printer-telegraph in the transmission of press information on one of the largest international press agencies was studied in 1932.⁸⁷ The printer-telegraph was more than twice as productive as the old Morse operator in this news agency. But because of the conditions of work the printer-telegraph has not caused a shift from men operators to women in the news-transmitting agencies as it has in commercial telegraph stations. While some Morse operators are retained as printer-telegraphers, in the agency studied less than 40 remained. Some of those who were released were recommended to positions as operators of Morse telegraphs in the brokerage firms whose expansion of business coincided in point of time with the displacement of Morse telegraphers by printer-telegraphs.

But this aid furnished Morse telegraphers by their shift to ticker-telegraph work in brokerage and other businesses was short-lived, for an automatic ticker was introduced about 1920, with the result that from 1921 to 1929 (the heyday of stock and bond trading) the number of automatic market-quotation tickers installed increased from 3,706 to 13,736. The number of stock exchanges equipped with ticker service increased to 30; but very few Morse operators were employed. Nor does the new ticker service require a comparable number of other workers. For example, in 1930, 8,623 tickers located in 30 different states, with circuits in 337 cities, were required to send the New York Stock Exchange quotations. Only 17 printer-telegraph operators were needed to man the entire service, and they found time to transmit bond quotations as well over 928 bond tickers scattered throughout the country.⁸⁸

With the increased efficiency and semiautomatic character of the printer-telegraph, it is apparent that only a very greatly expanded telegraph business will retain a comparable number of workers as operators. Even so, such workers as are retained are less skilled than the Morse operators whom they are so

⁸⁷ "Effects on the Employment of the Printer Telegraph for Handling News, April 1932," *Monthly Labor Review*, April 1932, p. 753.

⁸⁸ *Monthly Labor Review*, June 1932, p. 1269.

rapidly displacing. But, while the telegraph business has increased from 90,835,000 messages carried in 1902 to 215,595,000 handled in 1927,³⁹ in terms of its relation to population growth the gain was only from 1.14 messages per capita in 1902 to 1.81 in 1927. The telegraph has not shared proportionately with the postal and telephonic service in the increase in communication. In 1907 there were 71.9 pieces of first-class mail for every telegraph message sent; by 1927 the ratio had increased to 76.3 to 1. The gain of 137.3 per cent in volume of telegraph business, judged by number of messages sent in 1927 as compared with 1902, was not sufficient to maintain the labor forces of operators at the level prevailing when Morse telegraph machines were used.

Telephone.—Development has been considerably different in the telegraph and telephone industries, although the labor forces in both have been subjected to the influence of technological change. Changes in the telephone industry have resulted in a more economic and efficient service, which has so popularized the telephone and extended its business that even though the productivity per worker has been enormously increased a greater number of workers has been required to care for the expanded business. From 1,355,911 telephones in operation in 1900, the number increased to 20,201,576 by 1930.⁴⁰ There was a decline of 2.5 per cent from 1920 to 1930, and a sharper decline in the years of the depression, indicating that while the telephone is a necessity to most businesses it still remains a nonessential in many homes.

The telephone system which now connects the nation in one unbroken line of communication is a very recent thing. From many small independent and sometimes isolated companies the Bell System has been formed—a single corporation which owns either directly or through subsidiaries or controls by contract the communication of all but .5 per cent of telephone subscribers in the United States. This fact has great significance for workers. If one seeks employment in the telephone industry or its subsidiary electrical industries, he must expect to work for what is in reality a single employer. He cannot sell his services on an open competing market; and the conditions of his labor—remuneration, employment, layoff, advancement,

³⁹ Malcolm M. Willey and Stuart A. Rice, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1930, p. 196.

⁴⁰ *Ibid.*, pp. 198 ff.

retirement, collective bargaining, discharge, and so forth—will be established for an entire industry. While the American Telephone and Telegraph Company, this giant in control of the telephone business of the nation, has had a favorable attitude toward its employees in comparison with most industries, its power is so extensive that, should a "black list" be created, workers who may have achieved great technical skill and highly paid occupations in telephonic operations would be forced on the open market to sell their services in a different industrial field.⁴¹

Another aspect of the telephone industry which has great significance for labor is the constantly developing technical efficiency of the business. The growth in number of telephone calls per capita necessitated greater efficiency on the part of telephone company employees. From 64 calls per capita per year in 1902, the number increased to 246 per capita in 1930. But because of the increased installations of telephones the aggregate number of calls per phone per day declined from 6.7 in 1902 to 5.4 calls in 1927. There has been a steady increase in the length of toll calls, attesting the greater efficiency and more frequent use of long-distance telephoning. By 1930, 82 per cent of all long-distance calls were completed without the subscriber leaving his telephone. The dial system has considerably speeded up telephone connections, and by 1930 it was in use in a third of the entire Bell System, with further introductions impending.

So many factors, such as the shift from manual to dial operations, are involved that an accurate measure of the displacement of telephone operators by technological changes is difficult to obtain. In a very carefully developed study, with emphasis on understatement, the Department of Labor has reached certain pertinent conclusions.⁴² The number of operators employed by the Bell System in 1930 was 143,979. Had the average number of calls per month handled by an operator remained the same as it was in 1921, before any extensive introduction of the dial system had taken place, the number of operators necessary to handle the calls made in 1930 would have been 213,400, or an increase of 69,421 operators.

⁴¹ For a very thorough treatment of the telephone industry the reader is directed to the recent book by N. R. Danielian, *A.T. & T.*, Vanguard Press, New York, 1939.

⁴² "The Dial Telephone and Unemployment," *Monthly Labor Review*, February 1932, p. 235.

Complete conversion of telephones by all companies to the dial system would mean, on the basis of present business, a heavy loss of the employment opportunities afforded by the manual system. As two-thirds of the telephones are still manual, it is apparent that unless the extension of telephone service is sufficiently great, the change to the dial system will cause a severe reduction in the number of operators needed. However, the expanding toll business requires more high-grade operators and higher grade technicians, so that this loss is compensated for in some measures.

The telephone industry is quite sensitive to business cycles. The number of workers employed in telephone companies in 1933 was 32 per cent below the number at work in 1929.⁴³ Only if the business recovery is widespread and results in a greatly increased and diffused purchasing power is there any possibility of an amount of additional telephone business sufficient to employ the present number of operators.

The number of manual operators required to operate the switchboards in a city of 200,000 in New England in June 1930 was 534 women and girls. The telephone system was changed over to dial operation the middle of July of that year, and immediately following the cut-over only 260 operators were retained—a loss of 51 per cent.

In another city a partial change to the dial method was made in 1930.⁴⁴ The number of telephone operators required to operate the switchboards at the time of the change was 435, and immediately after the change it had dropped to 287. Six months later, when the modified partial-dial system had been perfected, the number of operators employed was 128. It is this grim prospect which faces many experienced operators as more telephones are placed on the dial system.

The dial-system operator can learn her duties and perform them efficiently after only 35 hours of work under supervision. Many telephone operators are girls, a substantial percentage of whom are using such employment as a tide-over until marriage. Because the work is easily learned and because of the pressure on the labor market of an increasing number of young

⁴³ *National Income in the United States, 1929-1935*, United States Department of Commerce, pp. 148-49.

⁴⁴ Ethel L. Best, "The Change from Manual to Dial Operation in the Telephone," *Bulletin Number 110*, United States Department of Labor, Women's Bureau, 1933, pp. 6-12.

girls, many of whom are partially or wholly supported at home, it is difficult to establish strong labor organizations to raise wages and to provide adequate protection against the hazards of employment which workers are facing in an industry so subject to technological change. Even when the corporation has shown an enlightened attitude toward its workers and has attempted many schemes for padding the blow delivered by technology, the force is too impersonal, the task too large, to be encompassed within the present profit-making scheme of things; and in the end workers are displaced and have to shift for themselves as best they may. This is particularly well shown with respect to the American Telephone and Telegraph Company. Under the impetus of depression and the urge to keep dividends as high as usual despite adverse business conditions, the management increased technological change after 1929 so that by 1935 some 185,000 fewer workers, or 40 per cent less, were employed than in the last year of prosperity. Nor was the labor force re-employable when business picked up. By the end of 1937 the volume of business done by the system surpassed 1929, but the number of employees was 134,000 smaller than in 1929.⁴⁵

One of the compensating factors which has prevented the technological advances just described from showing a reduction in the number of telephone operators since 1920 has been the growth of private exchanges. Since 1910 many businesses have expanded enormously, their plants extending over hundreds of acres, and their substations sometimes located miles away from the main buildings. Central offices of large firms have also grown, and the amount of paper work, recording, and tabulating has greatly enhanced the importance of quick, reliable signaling and communication. The number of new workers required by these new systems, however, is only a small proportion of those displaced by technological improvements in telephone companies. While the maximum number of private-exchange operators has not been reached—for many businesses are yet to be convinced of the desirability of these systems of communication—the rapid increase noted shortly after 1920 has slackened as fewer plants and offices have remained unserved. Furthermore, these new systems are being made as automatic as possible, and this has reduced the num-

⁴⁵ N. T. Daniellian, *A.T. & T.*, Vanguard Press, 1939, p. 200.

ber of workers needed. In private exchanges technological improvements frequently mean that a single girl will be retained regardless of the degree of automaticity achieved by the communication apparatus, and her free time will be devoted to some clerical task which is provided for her.

In the larger plants and offices, where private exchanges are extensive, the technological changes eliminated workers. It is impossible to determine at this time the probable effect that the extension of this private-communication business will have upon the labor force available for telephone communications; but only if these private systems become much more extensive than they are today can they halt the trend toward displacement of telephone workers previously described.

The telephone companies accounted for 82 per cent of all workers in telephone and telegraph communication in 1935.⁴⁶ Certain facts of value concerning this labor force are given in Table 214.

TABLE 214

NUMBER OF EMPLOYEES AND TOTAL WAGES AND SALARIES RECEIVED BY WORKERS IN TELEPHONE COMPANIES IN THE UNITED STATES, 1922-1932*

	1922	1927	1932	Change, 1932 over 1922
Total number workers	312,015	375,272	334,085	22,070
Percentage change .....	....	+20.3	-11.0	+ 7.1
Males	104,433	131,802	128,677	24,244
Percentage change .....	....	+26.2	- 2.4	+ 23.2
Females	207,582	243,470	205,408	-2,174
Percentage change .....	....	+17.3	-15.6	- 1.1
Total salaries and wages (in millions)..	\$352.9	\$486.5	\$458.1	....
Percentage change .....	....	+37.9	- 5.8	+ 29.8

* *House of Representatives Committee on Interstate and Foreign Commerce Report of Communication Companies, 73d Congress, 2d Session, House Report 1273, Part 3, No. 1, p. 943.*

While this table lacks sufficient detail for full analysis, it does present an over-all view of the conditions. The total number of workers reached a maximum in 1927 and declined by 1932. Males employed in the telephone industry as linemen, foremen, inspectors, technical workers, salesmen, and officials, while only slightly more than a third of all telephone workers,

⁴⁶ *National Income in the United States, 1929-35, United States Department of Commerce, p. 148.*

gained more during the expansion period and later did not suffer the same percentage of loss as did females, who were the larger body of workers and who were subjected to much technological displacement.

While salaries and wages increased proportionately more than workers during the period of expansion of the industry, they tended to maintain their relative position afterward. However, this collection includes salaries of officials as well as wages of workers, and it may be that the topmost incomes do not respond to changes in economic conditions as quickly as do wage earners' incomes, or it may be that elimination of the lower-paid female operators in favor of more better-paid skilled technicians resulted in higher rate of pay for the average worker. This may account for the fact that the total wage bill failed to fall in proportion to the decrease in the number of workers since 1927.

By analyzing the distribution of the income of the telephone companies as reported by the Department of Commerce, it appears that capital claimants and dividend- and interest-takers have been well protected in both good business seasons and bad, whereas no such care has been taken of workers. In comparing 1929 with 1933, it is found that the income paid out to capital claimants had increased by 47 per cent, while the income paid out to employees declined 33 per cent in this same period of time. This was not only the period of curtailed business, but was also a period of rapid changes to labor-saving forms of operation. Thus, many low-paid routine workers were released. With the higher-paid personnel still on the staff, the per capita income of employees did not show a drop commensurate with the percentage decline of the total wage bill. So that, in view of lower living costs, the 32 per cent fewer workers who were still employed in 1933 were slightly better off than they had been formerly. For the third of the workers eliminated from the service and thrown on a flooded labor market, however, the situation had become dire.⁴⁷

A tendency to increase the number of supervisory personnel in a large corporation as the business becomes more automatic and requires fewer manual workers is frequently noticed. Sometimes this is due to the competitive nature of the industry and the necessity of securing a larger volume of business in

⁴⁷ *National Income in the United States, 1929-35*, United States Department of Commerce, pp. 152-54.

order to keep unit costs low and move the mass product. This is not so true in the telephone industry, where a single corporation has a virtual monopoly of the business. But even here there is need of expanding the business through sales promotions and various kinds of partial-rate services, to build up the toll-charge business which is so lucrative, and to improve business methods in order to continue the level of profits.

Furthermore, as the monopoly became nationwide, the extensive system that had been established could be operated successfully only by the adoption of uniform practices, and this has required an increasing number of foremen, overseers, and officials to enforce the rules and prevent even minor breakdowns which might lead to larger losses. In order to secure an ever expanding and more profitable business, as well as to conduct that business efficiently, the telephone company has found it necessary to add continually to its officials. Thus, while the trend may be toward more automatic operation within telephone stations, which will reduce the labor force needed there, it is probable that for some time to come the supervisory and business personnel will increase.

The construction staff is likewise growing and, except during periods of business depression when major extensions in telephone service are seldom made, is likely to continue to expand for some time. Here, too, technological advance has been pronounced, with the productivity of construction workers greatly increased by motor transportation of men and equipment, new types of wires, insulators, and tools, and construction machinery for excavation and fill-in of trenches. Only a continually increasing mileage of lines, new installations of telephones, and new underground cable-laying could offset these mechanical advances sufficiently to permit the increases noted in the census in the number of construction workers in the telephone industry. Because there is a growing demand for the removal of unsightly and dangerous overhead wiring strung on poles, and because of the growth of suburban communities, it is possible that the immediate future will witness still greater needs for communication construction workers.

More revolutionary changes in the communication service are impending, especially with the commercial adaptation of the radio telephone and television. Signaling and automatic communication systems are only in their infancy. Yet because

of a unified business structure and monopoly control bent upon the protection of profits, even to the extent of using outmoded and obsolete equipment, the consumer is at the mercy of the business and financial offices of the communication companies, instead of immediately receiving the benefits of the product of the engineering laboratories in these companies.⁴⁸ Only under great pressure, usually exerted by the government, are the benefits of these engineering improvements passed on to consumers in lower rates. Technology has its way, obviously, only when it will reduce operating costs and yield larger profits. This usually means fewer workers in proportion to volume of business and a proportionately lower total wage bill. When the maximum equipment and service has been provided, it means a cessation of new employment and replacements of workers only as required to operate the system efficiently. It may actually mean, as technological changes are made in the face of a stationary or nearly stationary business volume, a numerical decrease in the labor force employed.

The telegraph and telephone industry, so far as its station-operating forces within commercial companies are concerned, seems to have reached the stage of maximum need for workers, and may be entering upon a period of permanent decline in the number required. In the construction and official forces, however, there are evidences that a still larger expansion will be experienced and that more of both kinds of workers will be required.

Because of the monopolistic control of new inventions in the communication fields, it is not probable that the present organization of the telegraph and telephone industry will be drastically altered immediately.

Express Company Workers and Railway Mail Clerks (Tables 209 to 211).—In 1930 there were 4,176 express agents. While there was a slight though continuous trend toward fewer express agencies and agents located primarily in the larger communities, the 1910–1930 figures seem to indicate a certain stability in the labor force engaged. With respect to the subgroup, Express Messengers and Railway Mail Clerks, it is probable that the number of railway mail clerks was the influencing factor in the trend for 1910–1930.

Despite the increasing volume of express business, railroad

⁴⁸ Jonathan Leonard, *Tools of Tomorrow*, Viking Press, New York, 1935, pp. 274–75.

express has not added greatly to its workers, probably because motorized delivery and new loading and unloading devices, together with more rapid means of communication, have greatly increased the per-worker productivity. But of even more significance is the fact that an increasing proportion of such business is being taken over by motor-transportation companies in a station-to-station and house-to-house delivery of both bulk and package goods.

The express business has a glamorous past, partaking as it did in the historic settlement of the West and the establishment of mail and passenger contact between the Eastern centers and Western villages. It has grown from the unorganized commercial period when the stagecoach driver carried messages and small packages to the time when several competing companies merged to form the American Express Company with railroad affiliations and a national collection and delivery system. In 1890, there were 18 express companies operating over a total of 174,060 miles; by 1916 the number had been reduced to 7 companies and their operating mileage had increased to 297,139.⁴⁹ In 1930 the two express companies then operating reported the number of miles covered by operations as 276,198.⁵⁰ In 1937 these same companies reported 282,091 miles covered by operations. This mileage was distributed as follows: steam roads, 211,572; electric lines, 2,842; steamboat lines, 20,363; stage lines, 11,480; airplanes, 36,194. The average number of employees of these companies was 36,040 in 1932 and 42,732 in 1937.⁵¹

When the United States entered the World War and the transportation and communication systems of the nation were taken over by the government, the express companies were unified into a single company. This continued to function until 1929, when the railroads formed their own express company and took over the assets of other companies and the express business became a subsidiary of the railroads. The present system of railway express has its own administrative organization, however, and five functioning divisions, namely: transportation of merchandise; transportation of money, securities,

⁴⁹ *Seventh Annual Report on the Statistics of Express Companies*, Bureau of Labor Statistics, Special Reports, p. 5. Also *Express Business in the United States, 1907*, Bureau of the Census, p. 8.

⁵⁰ *A Preliminary Abstract of Statistics of Common Carriers for 1930*, Interstate Commerce Commission, Summary No. 3, p. S-11.

⁵¹ *Statistics of Railways in the United States*, Interstate Commerce Commission, 1938, pp. S-206, S-208.

and valuables; purchase and selling of merchandise; forwarding of import and export; and issuance of money orders and letters of credit and the transfer of money by telegraph. It is obvious from this list of functions that the railway express business performs duties not fully duplicated by any other branch of the communication and transportation service.

When the parcel post service was opened by the government in 1913, it seriously threatened the express business by taking over a very substantial part of the shipment of packages. Transportation of express over scheduled air lines began in 1926 and has increased enormously since then. From a mere 3,555 pounds of express handled by air lines in 1926, air express grew to 8,355,010 pounds in 1936. It is quite probable that air express will continue to expand, taking away from railway express much of the business of shipping costly small packages which have to be transported with speed. However, the number of railway clerks required has been considerably increased by the entrance of the government parcel post into these fields.

Other Workers in Transportation and Communication Industries (Tables 215 to 220)

The census gathers together a wide variety of occupations, such as special messengers, parcel deliverers, workers in experimental laboratories in communication, and the like, under the caption, "Other Transportation and Communication Pursuits." In 1930 this group totaled 64,506 workers, which was only .13 per cent of all gainful workers and 1.6 per cent of all persons in Transportation and Communication. The number of such workers is subject to classification changes in successive decades. In 1930 this miscellaneous group was only slightly larger numerically than in 1910. In relation to all the groups studied, it has shown a decrease from 1910 to 1930. Within this group, however, the importance of small enterprises operated by owners, and the significance of specialized jobs as foremen, overseers, and inspectors is to be noted.

While activity in communication and transportation fields may be expected to continue, with such miscellaneous occupations maintaining their present significance, or even expanding somewhat, the trends would suggest that there is little likelihood that any abrupt expansion of unusual magnitude will occur. Industrial history, such as has been reviewed in this chapter, further corroborates this conclusion.

TABLE 215

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN OTHER TRANSPORTATION AND COMMUNICATION PURSUITS, 1910-1930*

Group	1910		
Proprietors, Managers, and Officials ^a	{ 39,545	18,594	17,943
	{ 70.5	41.3	27.8
Foremen and Overseers	{ 10,437	13,483	10,880
	{ 18.6	29.9	16.9
Inspectors	{ 689	1,240	5,538
	{ 1.2	2.8	8.6
Apprentices	{		4,326 ^b
	{		6.7
Other Occupations	{ 4,055	5,809	21,158
	{ 7.2	12.9	32.8
Laborers (Other Transportation and Communi- cation Pursuits) ^a	{ 1,361	5,920	4,661
	{ 2.4	13.1	7.2
Total	{ 56,087	45,046	64,506
	{ 99.9	100.0	100.0

* The census made no returns in 1870, 1880, 1890, or 1900.

^a Not otherwise specified.

^b Figures available for this year only. Apprentices are less than .01 per cent of the total population or of all gainful workers, and comprise .1 per cent of all transportation and communication workers. The number of female workers is negligible.

TABLE 216

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN OTHER TRANSPORTATION AND COMMUNICATION PURSUITS, 1910-1930*

Group	1910	1920	1930
Proprietors, Managers, and Officials ^a	{ 39,343	18,493	17,818
	{ 70.9	41.7	28.2
Foremen and Overseers	{ 10,436	13,470	10,869
	{ 18.8	30.4	17.2
Inspectors	{ 687	1,237	5,534
	{ 1.2	2.8	8.8
Apprentices			4,323 ^b
			6.8
Other Occupations	3,751	5,299	20,017
	6.8	12.0	31.7
Laborers (Other Transportation and Communi- cation Pursuits) ^a	1,288	5,826	4,637
	2.3	13.1	7.3
Total	{ 55,505	44,325	63,198
	{ 100.0	100.0	100.0

* The census made no returns in 1870, 1880, 1890, or 1900.

^a Not otherwise specified.

^b Figures available for this year only. Apprentices are less than .01 per cent of the total population or of all gainful workers, and comprise .1 per cent of all transportation and communication workers. The number of female workers is negligible.

TABLE 217

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN OTHER TRANSPORTATION AND COMMUNICATION PURSUITS, 1910-1930*

Group	1910	1920	1930
Proprietors, Managers, and Officials*	{ 202 34.7	101 14.0	125 9.6
Foremen and Overseers	{ 1 .2	13 1.8	11 .8
Inspectors	2 .3	3 .4	4 .3
Apprentices	{		3 ^b .2
Other Occupations	{ 304 52.2	510 70.7	1,141 87.2
Laborers (Other Transportation and Communi- cation Pursuits)*	{ 73 12.5	94 13.0	24 1.8
Total	{ 582 99.9	721 99.9	1,308 99.9

* The census made no returns in 1870, 1880, 1890, or 1900.

^a Not otherwise specified.

^b Figures available for this year only. Apprentices are less than .01 per cent of the total population or of all gainful workers, and comprise .1 per cent of all transportation and communication workers. The number of female workers is negligible.

TABLE 218

WORKERS IN OTHER TRANSPORTATION AND COMMUNICATION PURSUITS: PER-
CENTAGE OF TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL
WORKERS IN TRANSPORTATION AND COMMUNICATION, 1910-1930

Base	1910	1920	1930
Total population .....	.061	.043	.053
All gainful workers, male and female .....	.147	.108	.132
All in Transportation and Communication	2.234	1.475	1.613
[Males of]			
All male gainful workers .....	.184	.134	.166
All males in Transportation and Communication	2.317	1.567	1.700
[Females of]			
All female gainful workers .....	.007	.008	.012
All females in Transportation and Communication .....	.504	.320	.464

Laborers in Transportation and Communication
(Tables 219 and 220)

Laborers engaged in the several branches of the communication and transportation industry are semiskilled and unskilled workmen who sell physical labor in a variety of carrying, cleaning, and shoveling occupations. The total number of

TABLE 219

NUMBER AND PERCENTAGE DISTRIBUTION OF LABORERS, MALE AND FEMALE,
IN TRANSPORTATION AND COMMUNICATION, 1910-1930

Group	1910		1920		1930	
	Number	Per-centage	Number	Per-centage	Number	Per-centage
Road and Street Transportation	4,468	.7	31,450	5.6	107,663	17.3
Steam Railroads	543,168	90.2	470,199	83.9	435,058	70.0
Street Railroads	27,807	4.6	25,514	4.6	27,416	4.4
Water Transportation	14,267	2.4	5,966	1.1	11,329	1.8
Air Transportation					1,609	.3
Communication	10,927	1.8	21,546	3.8	33,464	5.4
Other Transportation and Communication Pursuits	1,361	.2	5,920	1.1	4,661	.8
Total	601,998	99.9	560,595	100.1	621,200	100.0

TABLE 220

PERCENTAGE DISTRIBUTION OF LABORERS IN TRANSPORTATION AND COMMUNICATION BY GROUPS AND BY SEX, 1910-1930

Group	1910		1920		1930	
	Male	Female	Male	Female	Male	Female
Road and Street Transportation	99.9	.1	99.6	.4	99.8	.2
Steam Railroads	99.4	.6	98.6	1.4	99.3	.7
Street Railroads	99.3	.7	98.2	1.8	99.0	1.0
Water Transportation	99.4	.6	99.9	.1	100.0	..*
Air Transportation .....	...	...	...	...	99.6	.4
Communication	99.2	.8	99.5	.5	99.9	.1
Other Transportation and Communication Pursuits	94.6	5.4	98.4	1.6	99.5	.5
Total	99.4	.6	98.7	1.3	99.4	.6

* Less than .1 per cent.

laborers attached to all transportation and communication industries in 1930 was 621,200, or 15 per cent of all persons engaged in communication and transportation and 1.3 per cent of all gainful workers. The fact that no separate figures for laborers in these industries are available prior to 1910 makes it necessary to group laborers in each branch of the industry in which they work in order to obtain a comparable series from 1870 to 1930.

The number of laborers required depends upon the amount of construction and maintenance work under way. In comparison with the trend of development of the total of gainful workers, these laborers have failed to increase relatively since 1910. Likewise, their proportion of all transportation and communication workers has become smaller, testifying to the fact that occupations in transportation and communication are being specialized, resulting in a lessened need for common labor.

The actual number of laborers dropped considerably in 1920, as shown in that census, which was taken just following the war and at the beginning of a slump in construction work. These fluctuations are more apparent than real, however, and the table which details the composition of the laboring group shows that it is caused primarily by changes in census classifications; for example, a new group, namely, Truck, Transfer, and Cab Laborers, appears for the first time in 1930, and swells the total by almost 41,000.

The principal group of laborers, making up 70 per cent of all laborers in the Transportation and Communication group, is that of Section Hands and Yard Laborers in Steam Railroads. Their number declined steadily from 1910 to 1930, involving a loss of 20 per cent in twenty years.

CHAPTER VII

TRADE

General Characteristics (Tables 221 to 226, Charts 6 and 11)

Workers in the Trade group are engaged as agents, bankers and brokers, wholesale and retail tradesmen and salesmen, real estate and insurance agents, and kindred workers, all of whom make up the labor force used in exchanging goods and chattels, in financing business enterprises, and in performing business services of many kinds. This important branch of our economic life engaged the attention of 6,277,574 persons in 1930. This was 12.9 per cent of all workers and 5.1 per cent of the entire population.

Of all gainfully employed, the Trade group is third in numerical importance, being exceeded only by that of Manufacturing and Mechanical Industries and by Agriculture. Workers in trade have increased in every successive decade since 1870—from 4.6 per cent of the gainfully employed at that time to more than double that proportion in 1930. The relative importance of the subgroups in Trade in 1930 was as follows:

Group	Percentage
Agents	3.9
Bankers and Brokers.....	3.5
Commercial Travelers	8.6
Hucksters and Peddlers.....	0.9
Merchants	27.6
Proprietors, Managers, and Officials.....	1.3
Insurance Agents, etc.	4.6
Real Estate Agents, etc.	3.8
Salesmen and Saleswomen (including clerks in stores)	39.4
Undertakers	0.5
Other Persons in Trade.....	10.9
Total	100.0

While there are many different occupations listed under the census caption of Trade, the numerically significant groups are merchants dealing in both wholesale and retail trade and their sales force of men and women, who together comprise 67 per cent of all trades people. These two groups constituted 72 per cent of the Trade group in 1870. But the phenomenal

TABLE 221

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE
AND FEMALE, IN TRADE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Agents	{ 20,316 3.5	33,989 4.1	174,582 11.8	241,162 10.8	86,532 2.3	161,067 3.6	245,127 3.9
Bankers and Brokers	{ 10,631 1.9	19,373 2.3	35,968 2.4	73,277 3.3	105,804 2.8	161,613 3.7	221,504 3.5
Proprietors, Managers, and Officials	{ 10,023 1.7	15,553 1.9	39,900 2.7	74,072 3.3	43,086 1.2	61,213 1.4	83,468 1.3
Commercial Travelers	{ 7,262 1.3	28,158 3.4	58,691 4.0	92,919 4.2	163,620 4.4	179,320 4.1	223,732 3.6
Hucksters and Peddlers ...	{ 34,337 6.0	53,491 6.4	59,083 4.0	76,649 3.4	80,415 2.2	50,402 1.1	56,610 .9
Merchants, Wholesale and Retail (including butchers)	{ 402,001 70.1	555,680 66.6	796,781 54.0	946,405 42.4	1,165,662 31.3	1,351,447 30.6	1,730,437 27.6
Salesmen and Saleswomen	{ 14,203 2.5	32,279 3.9	264,394 17.9	611,139 27.4	1,326,908 35.7	1,606,117 36.3	2,470,994 39.4
Insurance Agents, Man- agers, and Officials .....	{ ..... .....	..... .....	..... .....	..... .....	97,964 2.6	134,978 3.1	286,235 4.6
Real Estate Agents and Officials .....	{ ..... .....	..... .....	..... .....	..... .....	125,862 3.4	149,135 3.4	240,030 3.8
Undertakers	{ 1,906 .3	5,113 .6	9,801 .7	16,189 .7	20,734 .6	24,469 .6	34,132 .5
Other Persons in Trade ...	{ 72,805 12.7	90,081 10.8	36,732 2.5	100,959 4.5	503,210 13.5	538,990 12.2	685,305 10.9
Total	{ 573,574 100.0	833,717 100.0	1,476,022 100.0	2,232,771 100.0	3,719,797 100.0	4,418,751 100.1	6,277,574 100.0

change which has occurred between 1870 and 1930 has seen a reduction in Merchants from 70 per cent of all trades people to 27 per cent, and an increase of Salesmen and Saleswomen from 2.5 per cent to 39 per cent. However, attention is called to the fact that both groups have increased in actual numbers since 1870.

The relative positions of the other groups within the category of Trade have not changed drastically, except that of Hucksters and Peddlers, which declined from 6 per cent of all trades people in 1870 to .9 per cent in 1930. Two other groups "born" during the last sixty years have become sufficiently important to require separate statistics since 1910; namely, Insurance Agents and Officials, and Real Estate Agents and Officials. All groups have gained in number since 1870.

In 1870 less than 5 workers out of every 100 were needed to sell the goods and render the services required of the business

TABLE 222

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
TRADE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Agents	{ 20,219 3.6	{ 33,553 4.2	{ 169,707 12.3	{ 230,606 11.4	{ 82,345 2.5	{ 149,427 4.0	{ 225,094 4.3
Bankers and Brokers	{ 10,616 1.9	{ 19,240 2.4	{ 35,458 2.6	{ 72,984 3.6	{ 103,170 3.2	{ 156,309 4.2	{ 212,312 4.0
Proprietors, Managers, and Officials	{ 9,955 1.8	{ 15,553 1.9	{ 39,683 2.9	{ 72,801 3.6	{ 39,001 1.2	{ 56,082 1.5	{ 75,569 1.4
Commercial Travelers	{ 7,230 1.3	{ 27,886 3.5	{ 58,080 4.2	{ 91,973 4.5	{ 161,027 5.0	{ 176,514 4.7	{ 219,790 4.1
Hucksters and Peddlers ...	{ 32,844 5.8	{ 50,999 6.3	{ 56,824 4.1	{ 73,794 3.6	{ 76,630 2.4	{ 48,493 1.3	{ 54,320 1.0
Merchants, Wholesale and Retail (Including butchers)	{ 96,269 70.5	{ 540,928 67.3	{ 771,113 55.8	{ 911,682 44.9	{ 1,101,419 34.0	{ 1,273,582 34.1	{ 1,620,373 30.6
Salesmen	{ 11,428 2.0	{ 24,535 3.1	{ 205,943 14.9	{ 461,909 22.8	{ 952,979 29.4	{ 1,070,387 28.7	{ 1,747,127 33.0
Insurance Agents, Man- agers, and Officials	{	{	{	{	{ 95,302 2.9	{ 159,589 3.5	{ 271,330 5.1
Real Estate Agents and Officials	{	{	{	{	{ 122,985 3.8	{ 139,927 3.7	{ 208,243 3.6
Undertakers	{ 1,976 .4	{ 5,058 .6	{ 9,808 .7	{ 15,866 .8	{ 19,921 .6	{ 23,342 .6	{ 32,192 .6
Other Persons in Trade ...	{ 71,623 12.7	{ 86,012 10.7	{ 35,501 2.6	{ 96,872 4.8	{ 438,178 15.1	{ 511,476 13.7	{ 633,467 11.9
Total	{ 562,160 100.0	{ 803,764 100.0	{ 1,382,117 100.1	{ 2,028,427 100.0	{ 3,242,907 100.1	{ 3,735,128 100.0	{ 5,301,417 99.9

community. But because of the complicated economic structure which has developed, with its rapid transportation and communication, the greatly increased amount of goods which have to be handled and sold, and the intricate financial arrangements needed to maintain solvency and credit, we now require over 12 persons out of every 100 to perform our business services. This does not include the great body of workers used to transport goods, to maintain our lines of communication, and to keep our accounts. If these were added, probably no less than 20 out of every 100 workers would be found in those occupations which are directly related to the selling and transporting of goods and the maintaining of business relationships.

From 1870 to 1900 the number of new workers added to the labor force in Trade totaled 1,659,197. But this substantial increase marked only the beginning of the greatest expansion,

TRADE

TABLE 223

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN TRADE, 1870-1930

Group	1870	1880	1900	1910	1930		
Agents	97	436	4,875	10,556	4,187	11,640	19,133
		1.5	5.2	5.2	.9	1.7	2.0
Bankers and Brokers		183	510	293	2,634	5,304	9,192
		.4	.5	.1	.6		.9
Proprietors, Managers, and Officials			217	1,271	4,085	5,131	7,899
			.2	.6	.9	.8	.8
Commercial Travelers	{ 8	272	611	946	2,593	2,806	3,942
.1			.7	.5	.5	.4	.4
Hucksters and Peddlers ...	1,493	2,492	2,259	2,915	3,785		1,790
	13.1		2.4	1.4			.2
Merchants, Wholesale and Retail (including butchers)	5,732	14,752		34,723	64,243	77,865	110,064
	50.2	49.3	27.3	17.0	13.5	11.4	11.3
	2,775	7,744	58,451	149,230			723,867
	24.3	25.9		73.0	78.4	78.4	74.2
Insurance Agents, Man- agers, and Officials					2,662		14,705
					.6		1.5
Real Estate Agents and Officials					2,927		31,787
					.6	1.3	3.3
Undertakers					813	1,127	1,940
					.2	.2	
Other Persons in Trade ...	1,182		1,231	4,087	15,032	27,514	
	10.4	13.6	1.3		3.1	4.0	5.3
Total	{ 11,414			204,344	476,890		976,157
		} 100.0	100.1	99.9	100.0	100.1	100.1

TABLE 224

WORKERS IN TRADE: PERCENTAGE OF TOTAL POPULATION AND OF ALL GAIN-
FUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	1.488	1.662	2.357	2.938	4.044	4.180	5.113
All gainful workers, male and female	4.586	4.794	6.492	7.680	9.746	10.618	12.856
[Males of]							
All male gainful workers	5.269	5.451	7.343	8.539	10.777	11.300	13.923
[Females of]							
All female gainful workers .....	.622	1.132	2.399	3.841	5.905	8.000	9.079

for in the thirty years following 1900 an additional 4,044,803 workers found their way into trade. It is possible that business practices have not kept pace with the technological ad-

vances made in productive enterprises and that the greatly extended amount and range of products have required the development of a "buying public" which necessitates many more "sellers." Technological advance in manufacture has not depended to any such degree upon the "human equation" as it has in business, where buyer meets seller and the medium of business is advertising and verbal persuasion. The very nature of merchandising limits the introduction of technology to routine sales of standardized character. Except at the strictly clerical level human judgment inevitably plays a large part in business practices and further limits the use of technology.

It is true that many labor-saving aids to merchandising have been introduced, especially in the way of displaying and handling goods. Technological organization, particularly in larger stores, has brought a degree of efficiency to both wholesale and retail trade far above the level of that of the cross-roads stores of former years. But all these advances in selling goods and transferring them to ultimate consumers in vastly larger quantities would not have been possible without very greatly increasing the sales and business force required in this process.

In comparison with the growth in population and the total number of workers, these trades people have developed as shown in Table 225.

TABLE 225

PERCENTAGE INCREASE OF WORKERS IN TRADE COMPARED WITH THAT OF THE TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Census	Total Population	Total Gainfully Employed	Total in Trade
1870 .....	....	....	....
1880	30.1	39.1	45.4
1890	24.8	30.7	77.0
1900	21.4	27.9	51.3
1910	21.0	31.3	66.6
1920	14.9	9.0	18.8
1930	16.1	17.3	42.1
1930 over 1870.	218.4	290.5	994.5

While the total gainfully employed population has increased almost 300 per cent in the above sixty years, the number of workers in trade has increased almost one thousand per cent. The rate of increase is substantially above that of

the total labor force in every decade. Even though the rate of increase declined perceptibly in 1920, following the business boom of the wartime period, it was still double the rate of gain of the national labor force.

While sharp distinctions cannot be drawn among the groups in Trade, it is possible, as suggested by Hurlin,¹ to divide all trades people into two fairly distinct groups. The "commercial" group is engaged in marketing the products of industry and agriculture; the "financial" group is busy maintaining the financial and credit institutions upon which business depends. How these two groups have developed in the three decades 1910-1930 may be seen in Table 226.

TABLE 226
INCREASE OF COMMERCIAL AND FINANCIAL GROUPS, 1910-1930

Census	Commercial		Financial	
	Number*	Percentage Increase	Number*	Percentage Increase
1910.....	3,390,167	....	329,630	....
1920.....	3,973,025	17.2	445,726	35.2
1930.....	5,529,805	39.2	747,769	67.8
1930 over 1910 ..	2,139,638	63.1	418,139	126.9

* Figures in the financial column refer to Bankers and Brokers, Insurance Agents, Managers and Officials, and Real Estate Agents and Officials; those in the commercial column refer to the remaining groups in Trade.

The commercial group in Trade is predominant, constituting in 1930 approximately seven-eighths of all workers in trade. However, while both groups have grown at a substantial rate, the financial group increased at more than twice the rate of the commercial group, in the twenty years from 1910 to 1930; for commercial workers increased 63 per cent, while financial workers increased 127 per cent.

Sex Composition of the Trade Group

The following display gives the essential information on the sex composition of the Trade group:

¹ Ralph G. Hurlin and Meredith B. Givens, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 286.

Census	Percentage	
	Males	Females
1870	98.0	2.0
1880	96.4	3.6
1890	93.6	6.4
1900	90.8	9.2
1910	87.2	12.8
1920	84.5	15.5
1930	84.5	15.5

In this group the importance of women workers was negligible in 1870, but by the turn of the present century they had begun to assume a more conspicuous place. The number of both male and female workers in trade continued to increase in successive decades; but the proportion of female workers reached its peak in 1920, at which level it remained a decade later. This would seem to indicate that a stationary condition has been reached in which approximately 15 per cent of all trades people are females, 85 per cent males. Whether or not the sexes will continue to remain in these proportions cannot be determined with any degree of accuracy because of the uncertainties in the field under review; but some clue to the probabilities may be found in the figures submitted in Table 227 on the sex composition within the Trade group in 1930.

TABLE 227
SEX COMPOSITION OF THE GROUPS WITHIN TRADE, 1930

Group	Percentage	
	Males	Females
Agents	92.2	7.8
Bankers and Brokers	95.9	4.1
Proprietors, Managers, and Officials.....	90.5	9.5
Commercial Travelers	98.2	1.8
Hucksters and Peddlers.....	96.8	3.2
Merchants, Wholesale and Retail (including butchers)	93.6	6.4
Salesmen and Saleswomen	70.7	29.3
Insurance Agents, Managers, and Officials.....	94.9	5.1
Real Estate Agents and Officials.....	86.8	13.2
Undertakers	94.3	5.7
Other Persons in Trade.....	92.4	7.6

The one group of the table in which females noticeably exceed males is that of Salesmen and Saleswomen (including clerks in stores), where women and girls constitute almost 30 per cent of all salespeople. As this is the numerically predominant group in Trade, and as women are increasingly

taking jobs from men in this area, it is probable that the next decade or so will show an even larger proportion of female workers in trade.

The only other occupation within the Trade category in which female workers are found in any large number is that of Real Estate Agents, in which 13 per cent of the group are women. In all other Trade occupations females are less than 10 per cent, ranging from 1.8 per cent of Commercial Travelers to 9.5 per cent of General Proprietors.

Agents

The group termed "Agents" in the census includes advertising agents, credit men, agents and canvassers, and claim agents and collectors. Reclassifications account for some of the abrupt changes noted in the census. Thus, in 1900 real estate and insurance agents and collectors were listed with agents; but these were specially classified elsewhere in 1910. This accounts largely for the drop in the number of agents reported in 1910.

The number of agents in 1930 was 245,127, which was .5 per cent of all gainful workers and 4 per cent of all persons engaged in trade. The census lists 83 different kinds of agents at work in 1930. They included a wide variety of occupational services in which one person was delegated to act for another.

Canvassers and sales agents comprise the largest single group within this whole field of activity. Some workers are employed in their spare time, but most agents are forced to work long hours in order to bring in sufficient sales to make a living wage. Most agencies are maintained both for advertising and sales purposes by large business concerns, who contract with agents and canvassers to make house-to-house calls advertising and selling their wares. Proportionately few agents are on a full-time salary basis, most business firms preferring to pay their agents and canvassers a part-salary, plus a percentage of sales. Many firms pay no salary at all, the agent depending entirely upon his sales for that percentage which will make up his wage.

The circumstances of agents in trade are almost as varied as the different kinds of agents who make up the group. Many so-called "outside salesmen" are not listed in the census, for they are occasional agents who take up selling after a longer or shorter period of unemployment. Helen Christine Bennett

quotes an authority, in answer to her inquiry regarding the number of agents, as saying that his best judgment put the figure at about a million.² The number fluctuates markedly in good and bad times. Only about 10 per cent of these outside salesmen were receiving regular salaries in 1934; 90 per cent were working on a commission basis, and most of them were paying their own expenses.

Despite poor conditions of employment, precarious nature of income, and long hours of house-to-house canvassing, more people were forced to enter such occupations as the depression wore on. The National Recovery Administration code hearings in Washington brought out startling evidence to the effect that conditions among agents, especially house-to-house canvassers, were very bad. Should a minimum wage of \$15 a week be required, fully one-third to one-half of all such agents would be forced on relief rolls because their sales did not warrant the payment of such wages.

It is probable, as indicated by the trends and the course of industrial history, that the number of agents will increase somewhat in the immediate future. That their circumstances will change greatly for the better is too much to hope, judging by the present conditions.³

Bankers and Brokers

Bankers and brokers numbered 221,504 in 1930, and were .4 per cent of all gainfully employed. In comparison with both the growth in total population and in the national labor force, the number of these bankers and brokers has increased at a more rapid rate in the successive decades since 1870. As the nation's economy expanded, so the need for more banking and investment facilities grew. With surplus from savings and profits accumulating, especially since the turn of the century, and even more particularly since the World War,⁴ a great capital fund was created which increased from approximately 12 billion dollars in 1923 to about 20 billions in 1929.

In the twenty years from 1909 to 1929 the United States moved from a state of chronic undercapitalization of its busi-

² Helen Christine Bennett, "One Million Excluded Men," *The Nation*, October 1934, pp. 385-86.

³ *The Professional Salesman*, NYA of Kentucky, Louisville, Kentucky, contains material relating to more specialized salesmanship, including sections on the advertising salesman and the wholesale salesman.

⁴ Harold G. Moulton, *The Formation of Capital*, Brookings Institution, Washington, D.C., 1935, pp. 142 ff.

ness enterprises, with frequent borrowings from Europe, to the place where its business institutions could absorb, in the face of even the very much enlarged buying-power of the 1920's, only about half of the available capital. The rest was siphoned off largely into stock-market speculations. This feverish activity increased considerably the brokerage business of the nation, and many persons who had previously been content with watching their bank balances grow sought quick riches in stock gambling.

Such movements have affected the number of bankers and brokers. Each successive college graduating class, particularly since 1910, has offered the financial occupations an increasing number of new recruits. Over against this enlargement in the banking and brokerage business of the nation must be set the hazards of periodic business depressions, bank failures, and stock-market crashes. A marked curtailment of certain aspects of banking enterprise, and a serious reduction in stock-market activity have resulted from reforms in banking since the crash in 1929. Certain controls have been established, such as the Securities Exchange Commission and the Federal Deposit Insurance Corporation, which tend to reduce activity in the financial world, thereby decreasing the number of bankers and brokers. Data on banks are given in Table 228.

TABLE 228
COMPARISON OF NUMBER OF BANKS AND VALUE OF ASSETS, 1890-1935*

Year	Banks		Assets	
	Number	Percentage Change	Total Assets (Million Dollars)	Percentage Change
1890.....	8,188	....	6,350.1	....
1900.....	10,382	+ 26.8	10,785.9	+ 69.9
1910.....	23,095	+122.5	22,450.3	+108.1
1920.....	30,139	+ 30.5	53,079.1	+136.4
1930.....	24,079	- 20.1	74,020.1	+ 39.5
1935.....	16,053	- 33.3	60,393.1	- 18.4

* Figures up to 1920 taken from the *Statistical Abstract of the United States, 1929*, Table 269, p. 284; figures since 1920, *ibid.*, 1936, Table 253, p. 242. The figures for 1935 include only licensed banks, that is, those banks operating under the full and unrestricted exercise of their charters.

The number of banks increased rapidly and without interruption from 1890 to 1920. But during the prosperous decade from 1920 to 1930, when financial operations were most active,

the number of banks actually declined—to 28,841 in 1925 and to 25,330 in 1929. Mergers, chain systems, and consolidations account for this decrease because, despite the reduction in number of banks, their activities were greatly enlarged and their assets grew substantially. In fact, the 24,079 banks operating in 1930 had the largest total amount of assets held by American banks at any recorded period of their history. Yet, despite the fact that bank assets in 1930 were 39 per cent above those of 1920, in that year, the number of banks was 20 per cent below the peak of 1920.

By 1935 the banking situation had resulted in unit and branch banks as indicated in Table 229.

TABLE 229

COMPARISON OF UNIT AND BRANCH BANKS IN THE UNITED STATES, 1935*

Region	Unit Banks		Branch Banks	
	Number	Percentage	Number	Percentage
United States	15,359	78.4	4,222	21.6
New England	857	68.8	388	31.2
Middle Atlantic	2,307	67.6	1,105	32.4
East North Central	3,136	82.9	649	17.1
West North Central	3,563	93.3	357	6.7
South Atlantic	1,562	76.6	476	23.4
East South Central	1,168	85.1	204	14.9
West South Central	1,732	94.9	93	5.1
Mountain	525	85.6	89	14.5
Pacific	509	34.6	961	65.4

* Statistics taken from "Banks," *Census of Business*, 1935, p. v.

The 4,222 branch banks had 890 main offices and 3,332 branches, an average of 3.7 branches per unit. This average picture does not truly represent conditions, however, for at one extreme were small systems having a single branch and at the other such institutions as the Bank of America in California, which had 491 branches. Branch banks, representing 21 per cent of all banks, employed 107,775 persons, or 40 per cent of all bank employees, and paid out salaries and wages which were 45 per cent of all compensation received by bank workers in 1935.⁵

Branch banking inevitably means the lowering of bank personnel status, for one of the advantages advanced for this method of banking as compared with independent banking is

⁵ "Banks," *Census of Business*, 1935, p. v.

the saving in compensation of bankers. Instead of independent bank owners, with access to bank profits, the branch-bank executives are hired workers dependent primarily upon their salaries. In 1935, 11 per cent of the personnel in branch banks were in executive positions, while in unit banks the executive officers totaled 29 per cent of their workers. However, while there are relatively fewer executive salaried positions in branch banks, salaries averaged \$5,995 for the year 1935 as compared with \$2,682 for executives in the unit banks. The figures do not take into account bonuses, which occur more frequently in branch banking systems, or bank-stock earnings, which are often carried by executives in independent banks. The branch banks are, on the average, larger institutions than independent banks; hence the salaries and wages paid are not exactly comparable. For employees other than executives branch banks paid average annual salaries in 1935 of \$1,520, as compared with average annual salaries of \$1,291 for unit banks.

The branch-banking system is comparatively new, and has had its greatest rate of growth since the World War. Its rise corresponds with the period following the peak number of banks and the decline which set in after 1920. This concentration of banking facilities and control bids fair to continue. What its ultimate effect upon the number of bankers may be cannot be foreseen. Yet it seems inevitable that it will reduce the number of executive positions, increase the number of higher clerical and administrative posts, and very definitely reduce most banking occupations to the clerical level.

The hazards of reduction in the number of banks and the possible decrease in the number of banking positions should be carefully examined. That bank mergers and consolidations will continue, despite the economic cycles of prosperity and depression, seems indicated by the figures on the decrease in number of banks both during the prosperous era of the 1920's and that of the great depression since 1930. It is apparent that modern means of communication and transportation and the changes being effected in manufacture and merchandising will permit an efficient banking system to operate with fewer outlets. How serious this matter of reduction in number of banks may become can be seen in the fact that during the prosperous period from 1920 to 1929 the number of banks decreased 4,809. During the depression from 1930 to 1935 their number was

further reduced by 8,026, so that the number of banks open in 1935 was less than at any period since 1900. This did not mean any such proportionate decline in banking business, however; for the 33 per cent fewer banks operating in 1935 had assets 14 per cent higher than in 1920.

Slightly more of the gainfully employed will probably be found in such occupations in the next census. However, in the period of modern banking, with the influences of consolidation and large-scale investments of a much-expanded industrial and business economy, the rate of increase in the numbers of bankers and brokers has slackened perceptibly. The gain was 52 per cent from 1910 to 1920, but only 37 per cent from 1920 to 1930. Total assets of banks—a very rough measure of financial activity and one which does not include brokerage activity in which brokers are engaged—increased more rapidly than the number of bankers and brokers. They experienced a gain of 136 per cent from 1910 to 1920, and one of 39 per cent from 1920 to 1930.

The rate of growth in banking and brokerage business has exceeded considerably the rate of increase in number of bankers and brokers required to handle the business. Thus, even in this field of our economy where human judgment and personal contacts are essential to the conduct of business, the productivity of workers has been advanced noticeably by alterations in business methods and practices. If continued long enough these will undoubtedly have the effect of limiting the number of bankers and brokers required to conduct the financial activities of the nation. In the lesser positions within banking and brokerage establishments, as noted in the chapter on clerical occupations, this condition has already had pronounced effect upon the labor force needed resulting in reduction in the number of workers.

Proprietors, Managers, and Officials

Floorwalkers, foremen, and overseers in businesses, and officials and proprietors (not otherwise listed) totaled 83,468 in 1930, which was .17 per cent of the total of gainfully employed. They were separated as follows: floorwalkers, overseers, foremen, 38,163; officials and proprietors, 45,305.

The number in both groups has been increasing in the successive decades of the census. Floorwalkers, overseers, and foremen increased 84 per cent from 1910 to 1930; officials in-

creased 102 per cent. Obviously, what has taken place in the internal organization of financial and trading institutions and in the enormous expansion of the total business structure, as discussed in this chapter, has caused this growth in officials of banks and stores. That they will continue to increase is indicated by both the trends to date and the industrial developments in trade and finance.

Commercial Travelers

Commercial travelers are wholesale salesmen who form one of the major connecting links between the factory and the retailer of goods. They have shared in the general growth of trading occupations despite all the forces which have been at work to limit their operations, such as retail-firm buying, standardization of goods, catalogue purchases, and location of wholesale houses at strategic places where retailers themselves can go to make their selections. The vast majority of all firms are small proprietorships which do not have either the time or the means to make extensive buying trips to replenish stocks. Because of business competition many wholesale firms have learned that commercial travelers making trips at regular intervals are necessary in order to secure the business of retailers. Some wholesalers have even gone so far as to alter the work formerly done by commercial travelers to include regular delivery of goods by them as well as the taking of orders. This is particularly noticeable in drugs and toilet articles, barbers' supplies, and some kinds of foods.

The number of commercial travelers totaled 223,732 in 1930; this was .45 per cent of the total of gainfully employed. They have increased in every decade since 1870, with a noticeable advance since 1900. In comparison with the development of the total labor force of the nation, the number of commercial travelers has increased at a more rapid rate, adding slightly to the proportion of all workers in each census of the past sixty years. Their number is too small, however, for this trend to alter significantly the composition of the total gainfully employed.

Judging by the trends to date, and the factors at work in our economy which require ever more insistently the movement of goods in order that trade may continue healthy, it is quite probable that the number of commercial travelers will continue to increase and to assume an ever larger place in the

national labor force despite the forces previously mentioned which curtail the activities of these workers. It is also probable that women will turn increasingly to this occupation but that for many reasons, some of which are inherent in the nature and conditions of the work done, commercial travelers as a group will continue to be quite predominantly male.

Hucksters and Peddlers

In the horse-and-buggy days of poor roads and little or no communication, both in the country and in many parts of our cities, a major contact with manufactured ware of many kinds was the huckster or peddler, who, either with his pack on his back or driving a horse hauling a wagon of goods, made the round of his customers. In many country districts it was something of a gala day when the peddler came and spread out his wares and notions before the farm folk. Quite often he engaged in simple barter, exchanging his goods for the butter and eggs of the farmer's wife. In the days before 1900 a considerable part of certain goods sold in rural areas passed through the hands of peddlers.

The trends show that peddlers increased in each successive decade from 1870 to 1910 but declined abruptly thereafter. From 1920 to 1930 they increased somewhat, but in the latter census year they totaled 56,610, which was less than in any census since 1880. In present-day economy hucksters and peddlers are confining their activities largely to cities, where they sell fruits and candies and newspapers and magazines. Taking advantage of the opportunity for a street-corner or curb service and the house-to-house canvass, such hucksters and peddlers have found a rather secure place in modern trade. In fact the census had become so certain of their role in business that such workers were included among retail dealers from 1910 onward.

In comparison with the development of the total of gainfully employed, the number of hucksters and peddlers increased more rapidly from 1870 to 1880 but declined in an uneven manner thereafter, until in 1930 it had leveled off at .11 per cent of all workers. This is the lowest proportion it had been of the total gainfully employed since 1870. Judging by these trends and by the current changes in merchandising, the increasing legislation against peddling, and the standardization of goods, it is probable that the number of hucksters and

peddlers will remain at about its present level and will become relatively less important in the total gainfully employed in the immediate future.

Merchants, Wholesale and Retail (Table 230)

Merchandising is the age-old field of opportunity by which a person of humble origin and circumstances may hope to become an owner, secure profits, and achieve some measure of personal security against the hazards of life. Our economic history is replete with stories of successful merchants who began as store clerks or errand boys. Merchandising is still looked upon largely as the way to become a member of the owning class and to climb out of the laboring levels. In fact, because of the capital outlay necessary in manufacturing, which is beyond the means of small artisan proprietorships, that avenue to ownership is almost entirely closed to enterprising but impecunious persons. But the corner store does change hands, population does increase, new sections of cities are developed, and with relatively little capital outlay an enterprising person can enter the field of retail merchandising.

TABLE 230

MERCHANTS, WHOLESALE AND RETAIL,* INCLUDING BUTCHERS:† PERCENTAGE OF TOTAL POPULATION, AND ALL GAINFUL WORKERS, 1870-1930

	1870	1880	1890	1900	1910	1920	1930
Total population.....	1.043	1.108	1.272	1.245	1.267	1.278	1.409
All gainful workers,							
male and female.....	3.214	3.195	3.505	3.255	3.054	3.248	3.544
[Males of]							
All male gainful							
workers	3.714	3.669	4.097	3.838	3.660	3.852	4.255
[Females of]							
All female gainful							
workers .....	.312	.557	.656	.653	.796	.911	1.024

* Includes also managers and superintendents of retail stores for 1910, 1920, and 1930.

† Wholesale and Retail Merchants includes butchers, transferred from Food in Manufacturing and Mechanical Industries, for 1870, 1880, 1890, and 1900.

Despite the growth of large merchandising units, the number of self-employed merchants has grown in each successive decade since 1870 to a total of 1,730,437 in 1930. They then formed 1.4 per cent of the total population, and 3.5 per cent of the total gainfully employed. During the thirty years from 1870 to 1900, there were 544,404 new merchants added; but during the last thirty years when the competition of large-sale mer-

chandising corporations was keenest, the number increased even more rapidly, adding 784,032 more merchants to the roster by 1930.

In comparison with the rate of growth of the total gainfully employed, the number of merchants has had an uneven trend. It declined somewhat in 1880 as compared with 1870, increased in 1890, declined again until 1910, and then increased in 1920 and in 1930 to a point where it formed practically the same proportion of the national body of workers as in 1890. However, relative to the growth in total population merchants have maintained their fraction of the people in the decades since 1870, indicating that there was about the same proportion of merchants in each decade, despite the fluctuations in living standards and tastes and habits of the people, alterations in merchandising practices, and a fundamental transformation of our productive, distributive, and financing mechanisms.

In comparison with the total body of tradespeople, however, the group of Merchants has altered radically during the years since 1870. At that time, as noted previously in this chapter, they were 70 per cent of the Trade group, indicating that trade was characterized by independent, self-employed merchants. Their paid sales force, or the other occupations in merchandising such as that of commercial traveler, were of relatively little importance. Only the larger firms employed such persons, and that there were relatively few large firms is indicated by the fact that salesmen and saleswomen made up only 2.5 per cent of all tradespeople in 1870. By 1930, however, the independent self-employed merchants had been forced to share the merchandising field with a whole corps of workers, among whom salesmen and saleswomen alone had become 39 per cent of all who were engaged in selling goods and rendering business services.

The census groups wholesale and retail merchants under one caption. When separated they appear as in Table 231.

TABLE 231
PERCENTAGE COMPARISON OF WHOLESALE AND OF RETAIL MERCHANTS,
1910-1930*

Census	Wholesale	Retail
1910	4.1	95.9
1920	5.2	94.8
1930	4.7	95.3

* The figures are taken from *Fifteenth Census of the United States, 1930, IV, 13-14*, for the years indicated. Unfortunately, data for previous years are not available in this segregation.

Wholesalers formed only 4.7 per cent of all merchants listed in 1930. The typical American merchant is a proprietor of a small retail business. In 1929 half of the stores of the country handled a business of less than \$12,000, the average for this group being less than \$5,500.⁶ Approximately 40 per cent of all retail stores in 1935 were operated by the proprietor and his family without the help of paid employees.⁷ At the other extreme are the incorporated retail and wholesale concerns, which did a large volume of business. In 1929 corporations secured 63 per cent of all income derived from trade, only 37 per cent going to independent proprietors, partnerships, and other unincorporated wholesale and retail establishments.

Retail Trade.—The number and kinds of retail establishments are given in Table 232.

TABLE 232

NUMBER AND KIND OF RETAIL STORES, PERCENTAGE OF ALL STORES, PERCENTAGE OF ALL SALES, AND NUMBER AND PERCENTAGE OF WORKERS, 1929*

Kind of Business	Stores		Net Sales Percent- age	Workers	
	Number	Percent- age		Number	Percent- age
Food stores	481,861	31.23	22.07	723,407	16.2
Eating and drinking	134,293	8.70	4.33	477,776	10.7
General stores (with food)	104,089	6.74	5.23	137,954	3.1
General merchandise	54,636	3.54	13.12	827,776	18.5
Apparel	114,266	7.41	8.63	404,130	9.0
Automotive	136,172	8.82	15.94	535,456	12.0
Filling stations	121,513	7.87	3.64	150,521	3.4
Furniture, etc.	58,941	3.82	5.61	271,502	6.1
Lumber, building, hardware	90,386	5.86	7.83	328,013	6.5
Drugstores	58,258	3.78	3.44	178,852	4.0
Other retail stores	173,618	11.25	9.86	456,693	10.2
Secondhand stores	15,065	0.98	.30	18,060	0.4
Total	1,543,158	100.00	100.00	4,510,140	100.1

* "Retail Distribution," *Census of Business, 1935, I, 1-8.*

Changes in business practices resulting from the necessity of selling goods to consumers on a curtailed or declining market, the merging of retail outlets, the direct-selling methods of manufacturing establishments, shifting habits and tastes of

⁶ Dorothea de Schweinitz, *Occupations in Retail Stores*, International Textbook Company, Scranton, Pennsylvania, 1937, reporting figures from the Retail Census for the year 1929, p. 16.

⁷ "Retail Distribution," *Census of Business, 1935, I, 1-9.*

consumers, and other alterations in business since the boom period of the 1920's have considerably affected the character and volume of retail trade. These changes should be carefully considered in any analysis of the nation's labor force.⁸ Their over-all effect may be partly seen in the data submitted in Table 233.

TABLE 233
PERCENTAGE CHANGE IN NUMBER OF STORES, IN NET SALES, AND IN
NUMBER OF WORKERS, 1929 TO 1935*

Kind of Business	Stores	Net Sales	Workers
Food stores	+10.4	-22.8	+ 3.0
Eating and drinking	+87.2	+12.5	+35.4
General stores (food)	-35.9	-56.8	-40.0
General merchandise	-18.3	-28.3	-11.9
Apparel	-16.0	-37.4	-18.9
Automotive	-14.3	-41.2	-29.3
Filling stations	+62.6	+10.1	+35.4
Furniture, etc.	-23.3	-53.2	-35.9
Lumber, building, hardware..	-19.0	-51.5	-33.1
Drugstores	- 2.7	-27.1	+ 7.8
Other stores	-12.9	-39.1	-34.2
Secondhand stores	+49.7	-23.5	+16.2
Total	+ 7.2	-32.5	-11.4

* "Retail Distribution," *Census of Business, 1935, I*, 1-108.

The year 1929 represents the last in the prosperous period of the 1920's when consumer buying power, upon which retail sales depend, was at its highest. The year 1935 marks the recovery following the depression from 1930-33; but it is on a different kind and level of prosperity as compared with 1929, with total income 34 per cent less⁹ and an unemployed population over three times as great. Consumers' buying power in 1935 was sustained in considerable part by government wage and relief payments of many kinds.

The first striking facts which emerge from this table are that the total number of stores increased (7 per cent), the total number of workers in these stores decreased (11 per cent), and the net volume of sales declined sharply (25 per cent).

The slight gain in number of establishments is due principally to a phenomenal increase in the number of eating and

⁸ Compare J. F. Pyle, *Marketing Principles*, McGraw-Hill Book Company, New York, 1936, chapter 1.

⁹ *National Income in the United States, 1929-35*, United States Department of Commerce, p. 23. The national income produced in 1929 totaled \$81,034,000,000. In 1935 it had recovered from a depression low point of \$39,545,000,000 in 1932 to a total of \$52,959,000,000.

drinking establishments following the repeal of the Prohibition Amendment, the growth in number of secondhand stores, and the large increase in the number of filling stations resulting from the greatly developed use of the automobile. Food stores made a 10 per cent gain in number. But all other types of stores decreased, the range being from a loss of 2.7 per cent for drugstores to one of 36 per cent for general stores.

Only eating and drinking establishments and filling stations experienced increases in the volume of net sales from 1929 to 1935. All other types of stores suffered losses, ranging from 23 per cent in food stores to 57 per cent in general-store sales.

Both eating and drinking establishments and filling stations showed the same percentage gain in number of workers during the period under review, namely, 35 per cent. The gain in number of workers in eating and drinking establishments placed that occupational group at the head of the list of retail-store employees, having over 16 per cent of the total in 1935. But while the percentage gain in the number of filling-station workers was the same as that of eating- and drinking-establishment employees, owing to their relatively small number they were only approximately 5 per cent of all retail-store workers in 1935. Food stores increased their labor force 3 per cent, while drugstores required 7.8 per cent additional workers. All other types of stores reduced their staffs, the losses in 1935 as compared with 1929 ranging from 12 per cent in general merchandising establishments to 40 per cent in general stores. These retail businesses are extremely sensitive to consumers' buying power. Their labor force is directly subject to this same factor, and its employment fluctuates in keeping with the national consumption income.

Arranged by types of stores and of ownerships, data are offered in Table 234.

A remarkable growth in chain enterprises has taken place since their origin with the opening of the Great Atlantic and Pacific Tea Company in 1858. While their development has not resulted in such concentration as would produce an actual decrease in the number of independent merchants engaged in trade, they have increasingly taken business from such merchants during the past sixty years in all fields of merchandising. Only the enormous growth in our consuming population and the revolutionary changes in our economy which have made us increasingly dependent upon purchased food and rai-

TABLE 234

PERCENTAGE COMPARISON OF KINDS OF STORES, THEIR OWNERSHIP,
EMPLOYEES, AND SALES, 1933*

Kind of Business	Stores		Sales		Employees	
	Independent	Chain, etc.	Independent	Chain, etc.	Independent	Chain,
Variety (5 cents to \$1.00)	54.5	45.6	8.8	91.2	6.6	93.4
Groceries, without meat	84.3	15.7	54.3	45.7	44.7	55.3
Groceries and meat	82.0	18.0	56.1	43.9	54.2	45.8
Shoe stores	71.0	29.0	46.5	53.5	46.2	53.8
Drugstores	91.3	8.7	74.0	26.0	71.2	28.8
Women's apparel	88.8	11.2	74.5	25.5	76.9	23.1
Department stores	40.4	59.6	67.3	32.7	76.9	23.1
Furniture stores	96.0	4.0	84.6	15.4	85.2	14.8
Hardware stores	98.3	1.7	95.6	4.4	94.3	5.7

* *United States Census of American Business*, "Retail Distribution," reported in the excellent treatise by Dorothea de Schweinitz, *Occupations in Retail Stores*, International Textbook Company, Scranton, Pennsylvania, 1937, p. 400. The column on "Chain, etc.," includes other types of multiple ownership. Except in shoe and department stores these other types were of negligible importance in 1933. In shoe stores they were 5.4 per cent of all stores and account for 7.3 per cent of all sales; in department stores they are 1.4 per cent of all stores and account for 8.8 per cent of all sales.

ment have prevented this growth of multiple ownership from actually reducing the number of independent proprietors. In some fields, such as meat marketing, chain stores have already actually reduced the number of butcher-proprietors. In other fields, such as variety stores, while owning less than half of all stores, chains have secured over 90 per cent of all business transacted and have effectively closed the chance of advancement of independent owners of small stores. In still other fields, such as drugs, chains operate less than 10 per cent of all stores; but even here their units are relatively so large that they account for 26 per cent of all sales.

The impetus toward chain stores and the crowding out of independent proprietors in merchandising came with the expansion of our capital structure, the quick methods of communication and transportation, and the urbanization of our people, especially since the turn of the century and more particularly since the World War. The movement is still young. Its probable effects upon independent proprietors in an ever widening area of merchandising are yet to be fully felt.

Some observers have been wont to say that the figures on the number of independent proprietors in business indicate the yearning for ownership and self-employment rather than their

actual achievement. For the number of business failures, of both small and large businesses, makes proprietorship an occupation fraught with great hazards. This is especially true of the small independent business in which the family capital has been invested and where there is little else to draw on in case of need. Converse made an enlightening study,¹⁰ which should be called to the attention of all vocational guidance officers and prospective proprietors. He examined 11 different retail trades in 255 cities and towns of Illinois from 1925 to 1930. He found that during this strikingly prosperous period, which should have proved the most propitious time for entering private trade, of 9,718 small retail businesses operating in 1925, 4,502, or over 46 per cent, had quit business by 1930. The author of the study remarks: "A new business concern has two chances out of three of lasting until the end of the following year, an even chance of lasting until the end of the second year, and two chances out of five of lasting until the end of the third year."

Another illuminating study, recently published, corroborates Converse' findings for a different part of the country. Business proprietorships were studied for Poughkeepsie, New York, from 1843 to 1936.¹¹ Almost 30 per cent of all businesses lasted a year or less, more than half failed to continue into their fourth year, two-thirds had disappeared by their fifth year, and four-fifths had gone before reaching their tenth year of business. How various types of business fared can be seen in the following figures:

Kind of Business	Percentage That Failed	
	In Two Years	In Five Years
Confectionery	60.6	81.5
Saloons	51.8	72.1
Tailor shops	51.8	71.1
Restaurants	48.0	71.7
Meat markets	47.7	65.0
Cigar stores	46.5	72.1
Shoe repairers	45.3	64.0
Groceries	44.2	64.6
Barber shops	36.0	57.2
Express services	30.8	51.4

¹⁰ Paul D. Converse, *Business Mortality of Illinois Retail Stores from 1925 to 1930*, Bulletin No. 41, 1932, pp. 7, 33-34. University of Illinois Bureau of Business Research. See also his *Elements of Marketing*, revised 1938, Prentice-Hall, Inc., New York, pp. 721-32. Also John H. Cover, "Business and Personal Failure and Readjustment in Chicago," *Journal of Business*, University of Chicago, Vol. VI, No. 3, July 1933; *Mortality of Retail Stores in Colorado*, University of Denver Business Study, Vol. XII, No. 3, 1936; and "Anyone Can Start a Store," *Saturday Evening Post*, July 16, 1936.

¹¹ Ruth G. and Arthur R. Hutchinson and Mabel Newcomber, "Business Life and Death in a Hudson River Town," *Dun's Review*, Dun and Bradstreet, New York, June 1939, pp. 12-18.

Further data in this study, while considerably restricted in character, do permit of certain important suggestions: Corporate businesses live longer than individual businesses or partnerships; artisan proprietorships outlive general retail businesses; and among retail establishments small family enterprises survive longer than larger independent proprietorships.

Where the trade of the nation is located may be seen in Table 235.

TABLE 235
GEOGRAPHICAL DISTRIBUTION OF RETAIL STORES, 1930*

Geographical Location	Percentage of Total Population	Percentage of Retail Estab- lishments	Percentage of Workers in Retail Trade
New England	6.6	7.1	7.8
Middle Atlantic	21.4	25.0	24.4
East North Central.....	20.6	20.6	22.3
West North Central.....	10.8	11.0	10.9
South Atlantic	12.9	10.9	9.8
East South Central.....	8.1	5.8	5.0
West South Central.....	9.9	8.8	8.1
Mountain	3.0	2.9	3.0
Pacific	6.7	7.9	8.7
Total	100.0	100.0	100.0

* Dorothea de Schweinitz, *Occupations in Retail Stores*, International Textbook Company, Scranton, Pennsylvania, 1937, p. 399.

Wholesale Trade.—Wholesalers are proprietors who have goods in stock, or on display, take orders from retail merchants, and make deliveries of merchandise. The sales of such wholesalers totaled approximately half of all wholesale business made in 1935.¹² The other half of such sales was made by manufacturer's agents, brokers, or manufacturing establishments themselves. The trend, somewhat noticeable in the years since 1929, is in the direction of relatively more sales to be made by the latter group. From 1933 to 1935 full-service and limited-function wholesalers showed a gain of 7.4 per cent in number of establishments and 37 per cent in net sales. But the gains made by other types of wholesaling were much greater. Manufacturers' sales offices without stocks on hand made the greatest gain in business volume—55 per cent in the two years of business recovery. Manufacturing sales branches gained 50 per cent; and brokers-agents gained 42 per cent, and assemblers 40 per cent. The period is too short, however, for these figures to signify much with respect to the future trend.

¹² "Wholesale Distribution," *Census of Business, 1935*, I, 4-17. The approximation is only a rough one, owing to the inability to segregate the several types of wholesale businesses.

Judged by the census trends, merchants, both wholesale and retail, will continue to increase in number as the buying population grows, as tastes are cultivated and as purchasing power increases. Merchants dealing in staple goods are the majority of all merchants, and within this group those who sell food and wearing apparel are numerically dominant. To them the unsatisfied wants of the masses of the people should appeal particularly, and their lack of purchasing power should be of chief concern.

In the face of the several trends discussed previously—the concentration in wholesale and retail trade, the hazards of small-business proprietorships, and the effects of cyclic economic changes—independent merchants may continue to increase; but it is probable that their proportion of the total volume of business will decline and that along with this decline will come a reduction in their income. For many proprietors this will mean meager living conditions, frequently below the level of day laborers. On the more optimistic side of things can be noted the trend toward better merchandising habits among smaller proprietors and their organization into voluntary chains to effect economic wholesale purchases and to repel the advance of the powerful chain stores. The character of future merchandising has not been well enough determined by the trends to permit a final statement at present. But when these contending forces have produced a more definite conclusion, it is probable that independent merchants will still be of considerable importance in the distributive economy of the nation.

Salesmen and Saleswomen (Table 236)

Salesmen and Saleswomen is the largest single group of workers listed in Trade. In 1930 workers in this group numbered 2,470,994 men and women, comprising 2 per cent of the entire population and 5 per cent of the total gainfully employed. In comparison with the growth of the national labor force, these salespeople have increased more rapidly in every decade since 1870. Their numerical increase in the decade 1920–1930 was 864,877—the greatest ten-year growth in their history. Most salespeople are “clerking” in stores, and of those employed in retail trade about half are counter clerks.¹³

¹³ Dorothea de Schweinitz, *op. cit.*, p. 36. The author studied 363 firms employing over 60,000 workers in 18 representative communities in the United States. Of all engaged for pay, over 48 per cent were counter clerks and approximately another 18 per cent were directly engaged in serving or supervising the serving of customers.

TABLE 236

SALESMEN AND SALESWOMEN: * PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS

Base	1870	1880	1890	1900	1910	1920	1930
Total population.....	.037	.064	.422	.804	1.443	1.519	2.013
All gainful workers, male and female.....	.114	.186	1.163	2.102	3.477	3.860	5.060
[Males of]							
All male gainful workers .....	.107	.166	1.094	1.945	3.167	3.237	4.588
[Females of]							
All female gainful workers .....	.151	.293	1.493	2.805	4.630	6.266	6.732

* Includes clerks in stores in 1910, 1920, and 1930.

The description of salesmen given in the recent and refreshing study cited in this chapter, *Occupations in Retail Stores*, by Dorothea de Schweinitz, should be read by anyone interested in a detailed account of the composition and trends within this field of occupations. The author discovered that while the census trends on salesmen and saleswomen showed a marked expansion, there was not a single firm among those studied in detail over the United States in 1934-1935 that had not been forced to limit its staff and had not a waiting list of prospective employees without any openings available. However, employers responded that, generally speaking, there was always need for well-educated people of the store type. The federal government has attempted to meet this need, and since the passage of the George Deen Act by Congress the states are rapidly developing a vocational-training program intended to fit workers for advances in employment responsibilities.

The sales force in stores is subject to some seasonal and cyclic variation in employment. Yet, probably because they deal in necessities of life, the fluctuations of regular, full-time workers is not so great as in some other lines, particularly manufacturing. The index of decline from the average number of workers employed in 1929 in retail stores was 82 in 1935, as compared with 69 in the manufacturing of durable goods.¹⁴ Average annual earnings of employees in retail stores are given in Table 237.

¹⁴ Dorothea de Schweinitz, *op. cit.*, p. 409.

TABLE 237

AVERAGE ANNUAL EARNINGS OF FULL-TIME WORKERS IN STORES,
1929 AND 1933*

Kind of Store	1929	1933
All retail stores.....	\$1,312	\$ 986
Jewelry	1,783	1,376
Men's and boys' furnishings.....	1,769	1,291
Shoes	1,595	1,188
Motor vehicles	1,585	1,041
Hardware and implements.....	1,430	1,068
Women's apparel	1,293	991
Drugstores	1,260	985
Grocery and meat stores	1,250	1,035
Department stores	1,243	990
Variety stores	706	760

* Dorothea de Schweinitz, *op. cit.*, p. 411.

These figures are necessarily crude, and do not distribute average incomes by geographic areas or by types of work performed. They are included here only as suggestive of conditions prevailing in the retail trades where the majority of workers are salesmen and saleswomen. They indicate that the average person in these white-collar occupations receives little if any more in earnings than a skilled craftsman, and that cyclic fluctuations drastically reduce even these modest incomes.

The census trends assure an encouraging expansion in numbers of salespeople and their rapid growth in proportion of all gainfully employed. However, the competition for work in stores is keen, and the continuance of this trend of expansion will depend upon considerably enlarging the purchases of the consuming public in both amount and variety.

To re-employ those who were "let out" of stores as a result of recession or to employ new workers who will bring the present force of salespeople up to the figures represented by the census of 1930 will require a substantial business recovery. If present levels of business turnover are maintained, it will be necessary to meet the conditions noted by Miss de Schweinitz, in the following statement. "The competition for work in stores is great. The numbers which present themselves for employment are considerably greater than the number hired, wages thus being kept at a relatively low level. The chances are, however, that retailing will continue to grow in a country where

specialization in highly organized industries is a dominant trend."¹⁵

Insurance Agents, Managers, and Officials

The census presents separate figures for this body of workers since 1910. Their number has increased rapidly—from 97,964 in that year to 286,235 in 1930. In the latter year they constituted .5 per cent of the gainfully employed, and they have assumed a proportionately larger place in the national labor force in each decade.

While the insurance business is not new, it has expanded rapidly, particularly since the turn of the century, with the growth of our city population and the accumulation of economic surplus in savings which require investment. The number of life insurance policies of all kinds in force in 1930 was 122,212,000, and their face value was \$107,948,000,000.¹⁶ This is a phenomenal advance from 1900, when only 14,395,000 policies with a face value of \$8,561,000,000 were in force. Today fire insurance is a customary and usually an obligatory part of all construction enterprises, and the insurance of goods and chattels has increased enormously. The amount of fire insurance coverage in 1929 was \$153,902,400,000, for which the premium paid was \$1,353,200,000.¹⁷ Automobile insurance has become indispensable in the time-payment purchase of a car, and a great many owners have their vehicles and themselves insured against accident. Health insurance has made some headway, despite the organized opposition of certain medical leaders.

All in all, the insurance business has become an important part of modern economy. Yet in the field of automobile, property, and life insurance many prospective customers have not yet been insured. It has been estimated that something like 50 millions of American citizens are not as yet affected by insurance. The larger companies organize territorially under district managers, with agents to seek out and sell to such prospects. These are the people whom the census lists as Agents and Managers of insurance companies. While many of them are using these occupations as part-time or "fill-in" jobs pend-

¹⁵ Dorothea de Schweinitz, *op. cit.*, p. 10. Other materials on the topic are: "Store Occupations," Revised, *Occupations: A Series of Vocational Studies*, NYA of Illinois, Chicago, Illinois, Report No. 9, January 21, 1938; *Sales Persons*, NYA of Kentucky, Louisville, Kentucky, March 1938; and *Training Conference for Store Managers*, State Board for Vocational Education, Salem, Oregon, 1938.

¹⁶ *Statistical Abstract of the United States, 1935*, p. 277.

¹⁷ *Ibid.*, 1931, p. 305.

ing re-employment in other more regular lines of work, a growing number look upon insurance salesmanship as a life vocation. Such work fluctuates directly with the economic status of the people, expanding rapidly during prosperous times and contracting acutely during depressions.

It is probable that the long-term trends depicted in the census will continue to show an increasing number of men and women engaged in the insurance business. While their number is insufficient to alter greatly the composition of the total gainfully employed, a continued sharp increase, as already noted, will have some effect upon that body of workers.¹⁸

Real Estate Agents and Officials

Another rapidly expanding category of workers is the Real Estate group which, in 1930, totaled 240,030 and comprised .49 per cent of all workers. Such agents have had a fertile field for operations in the development and settlement of new land, the rapid growth of our cities, and the subdivision of large holdings.

The number of real estate operators has increased substantially since 1910, both numerically and in their proportion of the total gainfully employed. While the more populous states are now licensing real estate agents, requiring the payment of fees and certain knowledge of business law, and in this way tend to limit the number who engage in such activities, nevertheless, in view of the increasing congestion of population, the further subdivision of holdings, and the exchange of properties, it seems reasonable to expect further increases in the number of real estate operators. Such occupations require very little capital for small-scale operations and appeal to persons not inclined toward or equipped for manual labor. This work can be carried on by persons who require sedentary work or by elderly people. Enterprising women have found real estate rentals and sales an attractive type of work and are entering the field in rapidly increasing numbers.

Judged by the yet not fully standardized methods of real estate work, the increasing demand for real estate agents' services, the wide appeal which such occupations makes to many who formerly went into the semiprofessions or who are

¹⁸ "Insurance," Revised, *Occupations: A Series of Vocational Studies*, NYA of Illinois, Chicago, Illinois, Report No. 27, April 1, 1938. In the last ten years insurance per capita has increased two and a half times. See other useful material on insurance in *Professional Salesman*, NYA of Kentucky, Louisville, Kentucky.

dislodged from professional and higher clerical occupations for one reason or another, there is every reason to expect further increases in the number of real estate agents and officials. Their number is as yet too small for the present rate of increase, despite its substantial character, to alter materially the composition of the total gainfully employed. But this new group of occupations may be expected to play an increasingly important part in the national economy for some time to come.¹⁹

Undertakers

The transformation in the occupational service and the place in our economy held by undertakers is partially indicated by the fact that the most recent census classification proposes placing them in the category of Personal Service rather than in Trade, where they had been enumerated previously. In earlier times undertakers combined the work of preparing bodies for burial with tending a store of some kind, usually selling furniture and household equipment. Thus, census figures for the earliest decades are apt to be less accurate than those secured since the distinct occupation of undertaker emerged. In 1930 there were 34,132 undertakers. This figure constituted .07 per cent of all workers. The number of such workers has increased in the decades since 1870—not in any startling manner but with a rather even trend from census to census.

In comparison with the rate of growth of the total population whom they serve, the number of undertakers increased at a slightly more rapid pace from 1870 to 1910, held even in 1920, and again increased more rapidly in 1930. In that year there were 34,132 undertakers to care for a total of not to exceed 1,343,356 bodies, an average of 39.3 bodies per undertaker.²⁰ In 1910 the average was 38.8 bodies per undertaker.

This business has become well organized, and burial practices have changed so that the last rites are seldom performed outside of funeral parlors. Formerly it was customary to have the burial service in either the home or the church. At present,

¹⁹ For a brief review of the real estate business, see *Professional Salesman*, NYA of Kentucky, Louisville, Kentucky.

²⁰ Figures on deaths are for the registered area. *Mortality Statistics, 1930*, Bureau of the Census, p. 5. Some deaths occur in which bodies are not recovered for burial, which would bring down the total and average somewhat; but statistics are not available on this point.

undertaking establishments are usually refined, if not imposing, structures, and the capital required to enter this highly competitive field is substantial. Quite frequently, especially in the larger concerns, undertaking establishments are operated by businessmen who employ embalmers and morticians to lay out the dead. In many states embalmers and morticians are professional workers licensed to practice after having passed certain qualifying examinations. The census enumeration is not sufficiently exact, especially in former years, to permit any segregation of those engaged in the undertaking business.

The *Census of Business* in 1935 analyzed²¹ the business activities connected with burial of the dead. The pertinent facts shown relative to funeral directors, embalmers, and crematories are as follows:

Number of establishments.....	17,144
Proprietors and active firm members.....	17,078
Average full-time and part-time employees.....	36,648
Average wage per employee.....	\$1,085*

* Full-time and part-time employees.

As is suggested by the figures on number of establishments and number of proprietors, most funeral businesses are independently owned or are partnerships; very few are corporations. Each establishment averages more than two employees, who bring in bodies, prepare them for burial, and attend to funeral arrangements. The average wages paid are low, made so, in part, by the fact that a considerable number of the workers in such establishments are employed on a staggered or part-time basis, which is a result of the intermittent character of the work itself.

The functions performed by undertakers are supported by a whole series of other occupations, such as florists, casket manufacturers, and singers. In 1929 casket-making establishments numbered 414, and employed 13,033 wage earners. The manufacture of caskets added a total of 49 million dollars to the value of the materials utilized in their production.²²

Judging by the census trends on undertakers and the present developments in their operations, the number of such workers will continue to increase but at such a rate as to correspond rather closely to the death rate of the total population. There

²¹ "Service Establishments," *Census of Business*, 1935, I, xxvi-10.

²² *Census of Manufactures*, 1933, Table I, p. 228.

are certain noticeable tendencies toward concentration of ownership of undertaking establishments, and within these businesses there is an increasing tendency for a certain few larger concerns to secure more of the business. There is likewise a growth in the number of employed morticians and embalmers working for businessmen who conduct funeral establishments rather than for themselves in their own parlors. But, on the whole, the undertaking business is still quite largely in the artisan-proprietor stage, with owners and firm members conducting not only the business aspects of such activities but also doing those things required to prepare bodies for burial.

Other Persons in Trade (Table 238)

The number of persons classified by the census under the caption "Other Persons in Trade" was 685,305 in 1930. They formed 1.4 per cent of the total gainfully employed. How they are divided among the distinguishable occupations appears as follows:

Occupation	1930		Percentage Change since 1910
	Number	Percentage	
Apprentices	2,444	4	.....
Decorators, drapers, etc.	20,149	2.9	+277.3
Deliverymen, etc.	159,444	23.3	- 30.6
Inspectors, gaugers, etc.	16,743	2.4	+ 24.5
Laborers—coal- and lumberyards	113,669	16.6	+ 40.1
Laborers, porters—stores.....	208,688	30.5	+103.9
Newsboys	38,993	5.7	+ 31.3
All others	125,175	18.3	+200.6
Total	685,305	100.1	+ 36.2

The census does not permit a segregation earlier than 1910. Comparing the number engaged in the several occupations at that time and in 1930 it appears that all groups except deliverymen have increased. The radically changed methods of merchandising have caused this reduction in the number of deliverymen. Not only has the public responded to reduced prices on a "cash-and-carry" basis, but parcel delivery has been organized, with delivery companies collecting from the different stores and making deliveries along a set route according to a definite schedule. Wholesale units have been more strategically located in relation to the retail outlets served, thus reducing delivery cost. The revolution in transportation, which has made over common carriers in large part into house-to-house

TABLE 238

OTHER PERSONS IN TRADE: * PERCENTAGE OF ALL GAINFUL WORKERS,
1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
All gainful workers, male and female.....	.582	.518	.162	.347	1.318	1.295	1.403
[Males of]							
All male gainful workers .....	.671	.583	.189	.408	1.622	1.547	1.664
[Females of]							
All female gainful workers .....	.063	.154	.031	.080	.186	.322	.482

* Includes: Apprentices, wholesale and retail trade; decorators, drapers, and window dressers; delivery men in bakeries and stores; inspectors, gaugers, and samplers; laborers (coal, lumber yards, etc.), porters and helpers in stores; newsboys; other pursuits in Trade. "Other pursuits in Trade" includes other persons in Trade and Transportation less weighers, gaugers and measurers, added to Clerical in 1870, 1880, 1890, and 1900.

delivery units, has also tended to reduce the number of deliverymen employed. Deliverymen have decreased in numbers in each decade since 1910, and will probably continue to do so.

The number of decorators, drapers, and window dressers has increased, with considerable rapidity, from 5,341 in 1910 to more than 20,000 in 1930. Window displays are an essential part of store advertising—a far cry from the past when windows were heavily shuttered as the store was closed for the night. Interior decorators are in more demand as standards of living improve. The old-fashioned factory-made lace curtains which dressed the parlor windows of most homes in former years have given way to a wide variety of drapes more in keeping with the interiors and furnishing. Drapers are developing an extensive business and a skilled trade. All these forms of trade will probably continue to increase both in importance and in the number of workers which they employ.

In the growing variety of businesses the number engaged as samplers, gaugers, and inspectors has increased. It is likely that the public interest in good quality, full measure, and purity will create demands for even more such workers. As business enterprises become larger, with more business done under managers rather than owners, the regulation of that business will require more samplers, gaugers, and inspectors.

Laborers in coal- and lumberyards increased from 81,123 in 1910 to a maximum number of 125,609 in 1920, and then de-

creased to 113,669 in 1930. Changing methods of building, heating, and cooking, and cutting, sacking, and transporting of fuels have been responsible for the trend downward since 1920. Coal is still a major fuel, even in homes; but the modern use of gas, oil, and electric heating equipment is rapidly encroaching upon coal's domain. In view of all these circumstances, it is probable that the decline noted in the last ten years heralds a decreasing need for laborers in coal- and lumberyards which will continue for some time to come and which will be reflected in further sharp reductions in such workers.

The number of laborers used as porters and helpers in stores has grown in every successive decade since 1870. Despite the introduction of semiautomatic hauling and communication machinery, modern business requires an increasing number of unskilled persons to handle the increased volume of goods. It is probable, judging by the trends of the census and the events taking place in trade, that more such workers will be required in the future.

The number of newsboys and street hawkers has grown considerably since 1910. The volume of newspapers and magazines printed has grown enormously in the last twenty years, and such salespeople are apparently required to move this product. With the congestion of population in cities and the continuance of this growth in reading matter it is probable that the number of newsboys will also expand in the immediate future.

The collection of all other forms of trade which make up the Miscellaneous group within this category in the census has increased considerably since 1910. Judging by the diversity of business and the growth of specialties, it is probable that this group will expand in somewhat the same proportions in the years which lie immediately ahead. In fact, the prospect for employment in occupations providing favorable incomes and working conditions is to be found largely in these specialty occupations where some unusual talent or some unique product is presented in trade. It is in this field of business that many of the firms which have achieved considerable importance have had their start, and such areas of occupational performance should receive particular scrutiny on the part of prospective workers, vocational training, and guidance officers.

CHAPTER VIII

PUBLIC SERVICE

General Characteristics (Tables 239 to 247, Charts 1, 6, and 12)

The census classification for "Public Service" does not include all those engaged in one or another of the many occupations which are paid for at public expense. For example, a major group omitted is that of public-school teachers, who are classified as professional persons.

The Public Service category here treated comprises 18 groups taken from various occupational categories of the census, and is an attempt to assemble groups of workers whose occupations are directly related to national defense, public protection, social welfare, and the maintenance of public works. The number in this category in 1930 was 1,218,257, or about 1 per cent of the entire population and about 2.5 per cent of all gainful workers. The census data prior to 1910 are not comparable. In the twenty years from 1910 to 1930 the number of workers listed in Public Service had increased 573,552, or 89 per cent. The greatest decennial gain was 321,233 in the decade ending in 1930.

That public service has required such an increased labor force since the turn of the century is probably due to the phenomenal industrial development of the country, the growth of large enterprises, the amassing of great wealth and much property, the rapid urbanization of the nation, the influx of a veritable horde of unassimilated immigrants, changes in modes of living, inventions such as the automobile, the extension of laws, technical processes in government functions, and the need for increased civil, fire, and police protection. By reason of these swift changes, which took place with astounding rapidity as the nation reached economic and social maturity, it was inevitable that more public servants would be necessary to protect its citizens, settle disputes, preserve law and order, safeguard health, maintain public lines of communication and transportation, provide free amusement and recreational facilities, and establish a competent civil administration as a wholesome environment for the growth and development of homes, churches, schools, and business institutions.

Extensions made in public service since 1930, which include

PUBLIC SERVICE

469

TABLE 239

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN PUBLIC SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Firemen	14,534	35,606	50,771	73,008
	5.6	5.5	5.7	6.0
Guards and Watchmen	78,271	115,553	148,115
	12.1	12.9	12.11
Other Laborers	63,007	101,434	147,847
	9.8	11.3	12.1
Detectives	6,349	11,955	12,865
	1.0	1.3	1.1
Marshals and Constables	9,073	6,897	9,350
	1.4	.8	.8
Probation and Truant Officers	1,043	2,679	4,270
2	.3	.4
Sheriffs	7,134	10,683	15,338
	1.1	1.2	1.3
Public Officials	47,029	69,681	82,590	86,607	77,331	103,996	130,095
	66.8	65.0	44.6	33.3	12.0	11.6	10.7
Policemen	13,384	74,629	116,056	61,980	82,120	131,687
	12.5	40.3	44.6	9.6	9.2	10.8
Soldiers, Sailors, and Marines	23,338	24,161	27,919	43,195	77,153	225,503	132,830
	33.2	22.5	15.1	16.6	12.0	25.1	10.9
Other Public Service	10,268	21,458	41,637
	1.6	2.4	3.4
Abstracters, Notaries, and Justices of Peace	7,445	10,071	11,756
	1.2	1.1	1.0
County Agents and Farm Demonstrators	5,597
5
Keepers of Charitable and Penal Institutions	7,491	12,884	15,020
	1.2	1.4	1.2
Road and Street Building and Repairing, Laborers	180,468	115,836	290,354
	23.0	12.9	23.8
Street Cleaning	9,946	11,196	16,673
	1.5	1.2	1.4
Road and Street Building and Repairing (Other Occupations)	5,076	4,435	8,565
8	.5	.7
Road and Street Building and Repairing, Foremen and Overseers	7,064	9,568	23,250
	1.1	1.1	1.9
Total	70,367	107,226	185,138	260,392	644,705	897,024	1,218,257
	100.0	100.0	100.0	100.1	100.1	100.0	100.1

TABLE 240

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
PUBLIC SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Firemen	14,534	35,606	50,771	73,008
	5.8	5.6	5.8	6.1
Guards and Watchmen	78,168	115,154	147,115
	12.3	13.1	12.3
Other Laborers	62,278	99,910	146,758
	9.9	11.4	12.3
Detectives	6,162	11,562	12,180
	1.0	1.3	1.0
Marshals and Constables	9,071	6,880	9,288
	1.4	.8	.8
Probation and Truant Of- ficers	855	1,899	2,715
1	.2	.2
Sheriffs	7,131	10,827	15,064
	1.1	1.2	1.3
Public Officials	46,615	67,509	77,715	78,488	73,930	97,965	119,312
	66.6	64.3	43.2	31.2	11.6	11.1	10.0
Policemen	13,370	74,350	115,177	61,980	81,884	130,838
	12.7	41.3	45.8	9.7	9.3	11.0
Soldiers, Sailors, and Ma- rines	23,338	24,161	27,019	43,195	77,153	225,508	132,830
	33.4	23.0	15.5	17.2	12.1	25.6	11.1
Other Public Service	10,045	20,309	40,369
	1.6	2.3	3.4
Abstracters, Notaries, and Justices of Peace	6,660	8,588	9,848
	1.0	1.0	.8
County Agents and Farm Demonstrators	4,500
4
Keepers of Charitable and Penal Institutions	5,246	7,953	9,468
8	.9	.8
Road and Street Building and Repairing, Laborers	180,468	115,673	290,308
	28.4	13.1	24.4
Street Cleaning	9,946	11,192	16,672
	1.6	1.3	1.4
Road and Street Building and Repairing (Other Occupations)	4,726	4,331	8,524
7	.5	.7
Road and Street Building and Repairing, Foremen and Overseers	7,064	9,557	23,249
	1.1	1.1	2.0
Total	69,963	105,040	179,984	251,394	686,489	879,758	1,192,041
	100.0	100.0	100.0	100.0	99.9	100.0	100.0

PUBLIC SERVICE

471

TABLE 241

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN PUBLIC SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Firemen .....	{....	....	....	....	....	....	....
Guards and Watchmen ....	{....	....	....	....	103	399	1,000
	{....	....	....	....	1.3	2.3	3.8
Other Laborers .....	{....	....	....	....	729	1,524	1,094
	{....	....	....	....	8.9	8.8	4.2
Detectives .....	{....	....	....	....	187	303	685
	{....	....	....	....	2.3	2.3	2.6
Marshals and Constables ..	{....	....	....	....	2	17	62
Probation and Truant Of- ficers .....	{....	....	....	....	.2	.1	..*
	{....	....	....	....	188	780	1,555
	{....	....	....	....	2.3	4.5	5.9
Sheriffs .....	{....	....	....	....	3	56	274
	{....	....	....	....	....*	.3	1.0
Public Officials	{414 100.0	2,172 99.4	4,875 94.6	8,119 90.2	3,401 41.4	6,031 34.9	10,733 41.1
Policemen	{....	14	279	879	....	236	849
	{....	.6	5.4	9.3	....	1.4	3.2
Soldiers, Sailors, and Ma- rines .....	{....	....	....	....	....	....	....
Other Public Service .....	{....	....	....	....	223	1,144	1,268
	{....	....	....	....	2.7	6.6	4.8
Abstracters, Notaries, and Justices of Peace .....	{....	....	....	....	785	1,483	1,808
	{....	....	....	....	9.6	8.6	7.3
County Agents and Farm Demonstrators .....	{....	....	....	....	....	....	1,097
	{....	....	....	....	....	....	4.2
Keepers of Charitable and Penal Institutions .....	{....	....	....	....	2,245	4,931	5,552
	{....	....	....	....	27.3	28.6	21.2
Road and Street Building and Repairing, Laborers .....	{....	....	....	....	....	163	46
	{....	....	....	....	....	.9	2
Street Cleaning .....	{....	....	....	....	....	4	1
	{....**
Road and Street Building and Repairing (Other Occupations) .....	{....	....	....	....	350	104	41
	{....	....	....	....	4.3	.6	.2
Road and Street Building and Repairing, Foremen and Overseers .....	{....	....	....	....	....	1	1
	{....**
Total	{414 100.0	2,186 100.0	5,154 100.0	8,998 100.0	8,216 100.0	17,266 99.9	26,216 99.9

* Less than .1 per cent.

TABLE 242

WORKERS IN PUBLIC SERVICE: PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population...	.182	.214	.296	.343	.701	.849	.992
All gainful workers, male and female..	.563	.617	.814	.896	1.689	2.156	2.495
[Males of]							
All male gainful workers .....	.656	.712	.956	1.058	2.115	2.661	3.131
[Females of]							
All female gainful workers .....	.023	.083	.132	.169	.102	.202	.244

very substantial increases due to the depression emergency agencies of government, as well as to the natural growth of already existing permanent public-service occupations, have brought about further large additions to this force of workers in public service.

The nature of public service and the number of workers engaged in that service may be seen from an examination of the detailed summary tables. They indicate that by 1930 American society had developed a body of public employees to perform the following services:

Service Group	Number	Percentage
Public protection (police, firemen, etc.)..	527,463	43.3
Civil administration	486,290	39.9
Social welfare	15,020	1.2
Miscellaneous	41,631	3.4
Miscellaneous laborers	147,847	12.1
Total	1,218,257	99.9

Of the 18 groups in Public Service only one shows a sharp decline in the 1920-1930 decade. The Army was built up to wartime numbers during the World War, and demobilization had not been completed by 1920; hence there were considerably more soldiers under arms at that time than in 1930. Two other groups—Marshals and Constables, and Abstracters—have failed to share in the general sharp increase noted in the Public Service category. They are constitutional officers; hence additions to their staffs come slowly despite an increase in the volume of their work.

A comparison of the decennial increases of Public Service

with those of the total population and the total gainfully employed is given in Table 243.

TABLE 243

PERCENTAGE INCREASE IN TOTAL POPULATION, IN ALL GAINFUL WORKERS, AND IN PUBLIC SERVICE WORKERS, 1870-1930

Year	Total Population	All Gain- ful Workers	Public Service
1870 .....	....	....	....
1880	30.1	39.1	52.4
1890	24.8	30.7	72.7
1900	21.4	27.9	40.6
1910	21.0	31.3	47.6
1920	14.9	9.0	39.1
1930	16.1	17.3	35.8
1930 over 1870.	218.4	290.5	1,631.3

Because of census classification difficulties, the figures for Public Service prior to 1900 have doubtful value. The decennial increases since then indicate that Public Service is growing at a much more rapid rate than either the total population or the total body of workers. The gain from 1910 to 1930 was 89 per cent, whereas the gain in population was only 33 per cent and that in the total number of workers 28 per cent.

In Table 244 a detailed analysis is given of the classified and unclassified civil service employees of the federal government. Comparisons are made between the number employed in 1932, before emergency agencies became important, and in 1937 when they were probably at their peak. The latter figures, however, do not include persons on relief. In the five-year period the number of federal employees increased 52.3 per cent, totaling 813,448 in December 1937. The reader should remember that this is the entire body of federal employees except relief clients and the military and naval forces. It does not correspond with the census figures on Public Service, as it includes all levels of workers from unskilled to professional. Federal employees are predominantly white-collar workers of the clerical level.

During the five years the regular departments of government underwent great expansions in order to meet emergency requirements, registering a gain from 471,676 in 1932 to 670,734 in 1937, or 42.2 per cent. The number in independent offices increased even more rapidly, growing from 62,575 in 1932 to 142,714 in 1937, a gain of 128.1 per cent. Emergency agencies were almost nonexistent in 1932, but they employed almost

PUBLIC SERVICE

TABLE 244

COMPARISON OF TOTAL FEDERAL EMPLOYEES IN EXECUTIVE BRANCH,
DECEMBER 1932 AND DECEMBER 1937*

Department or Office	Totals		Percent- age Change, 1937 over 1932
	1937	1932	
White House	45	45	
EXECUTIVE DEPARTMENTS			
State	4,686	5,179	+ 10.5
Treasury ..	52,043	68,091	+ 30.8
War	49,101	89,055	+ 81.4
Justice	8,987	8,274	- 7.9
Post Office ^a	245,714	284,316	+ 15.7
Navy	46,936	67,357	+ 43.5
Interior ...	14,483	41,553	+186.9
Agriculture	26,371	80,125	+203.8
Commerce .	17,816	17,600	- 1.2
Labor	5,494	9,139	+ 66.3
INDEPENDENT OFFICES			
Alley Dwelling Authority		14	
American Battle Monuments Commission	35	98	+180.0
Board of Governors, Federal Reserve Banks ^b	208	411	+ 97.6
Board of Tax Appeals	145	125	- 13.8
Unemployment Census		75	
Central Statistical Board		39	
Civil Service Commission	623	1,075	+ 72.6
Civilian Conservation Corps		61	....
Commodity Credit Corporation		81	....
Electric Home and Farm Authority		84	....
Employees Compensation Commission	176	439	+149.4
Export Import Bank		12	....
Farm Credit Administration		3,573	....
Federal Communications Commission (formerly Federal Radio Commission)	257	602	+134.2
Federal Deposit Insurance Corporation		853	....
Federal Emergency Administration of Public Works		4,491	....
Federal Home Loan Bank Board		319	+262.5
Federal Housing Administration		2,745	....
Federal Power Commission		420	+663.6
Federal Savings and Loan Insurance Corporation		49	....
Federal Trade Commission	472	557	+ 18.0
General Accounting Office	1,974	5,055	+156.1

* Civil Service Commission reports.

^a Figure for 1932 includes 11,409 substitute clerks in first- and second-class offices, 12,619 substitute city and village delivery carriers, 2,181 substitute railway postal clerks, 784 substitute motor-vehicle employees, and 876 substitute watchmen, laborers, etc. Does not include 13,200 clerks at third-class offices, 22,510 contract employees, 32,732 clerks at fourth-class offices who are employed and paid by the postmaster, nor 21,988 mail messengers. The 1937 figure excludes 1,069 temporary employees in the District of Columbia and 76,232 outside the District.

^b In 1932 not subject to Civil Service Act.

TABLE 244 (Concluded)

Department or Office	Totals		Percent- age Change, 1937 over
	1932	1937	
INDEPENDENT OFFICES (Continued)			
Golden Gate International Exposition Commission		11	
Government Printing Office	4,758	5,616	+ 18.0
Great Lakes Exposition Commission			
Greater Texas and Pan-American Exposition Commission		16	
Home Owners Loan Corporation		14,827	
Interstate Commerce Commission	2,311	2,327	+ 0.7
Maritime Commission*	666	1,058	+ 58.9
National Advisory Committee for Aeronautics ...	309	461	+ 49.2
National Archives		304	
National Capital Park and Planning Commission		25	
National Emergency Council		258	
National Labor Relations Board		695	
National Mediation Board		69	
National Resources Committee		276	
New York World's Fair Commission		11	
Panama Canal	9,888	10,651	+ 7.7
Paris International Exposition Commission		17	
Prison Industries Reorganization Administration		24	
Railroad Administration	9	1	- 88.9
Railroad Retirement Board		1,506	
Reconstruction Finance Corporation	1,948	2,633	+ 35.2
Rural Electrification Administration		455	
Securities and Exchange Commission		1,094	
Smithsonian Institution	545	468	- 14.1
Social Security Board		7,516	
Tariff Commission	307	302	- 1.6
Tennessee Valley Authority		13,059	
Veterans Administration	34,111	35,067	+ 2.8
Bureau of Efficiency	43		-100.0
Alien Property Custodian	118		-100.0
Federal Board of Vocational Education	82		-100.0
Public Buildings and Parks, National Capital (Transferred to Interior Department in 1936) ..	3,069		
Commission of Fine Arts	3		- 66.7
War Finance Corporation	2		-100.0
Board of Mediation	24		-100.0
Federal Farm Board	233		-100.0
Geographic Board	3		-100.0
International Joint Commission		6	- 90.9
International Boundary Commission, Canada ...		5	0
International Boundary Commission, Mexico ...	29	29	0
Inter-American High Commission		5	0
Century of Progress			-100.0
Works Progress Administration		22,735	

* Formerly the United States Shipping Board.

fifty thousand administrative personnel in 1937. Eight very small agencies having 513 workers in 1932 had disappeared by 1937; but 31 new agencies had been created, with a labor force of 74,983, to cope with the depression.

The Army and Navy totaled 298,467 officers and enlisted men in 1938, a gain of 31.3 per cent from the low postwar enrollment in 1925. Of that number, 183,447 were in the Army and 115,020 in the Navy. The defense forces of the nation have been increasing steadily since 1925, and with the present greatly increased attention to national defense will undoubtedly expand rapidly. The strict requirements as to age and physical fitness make it a highly selective service open primarily to American youth.

In Table 245 a summary of civil service employees and full-

TABLE 245
POLITICAL JURISDICTION IN THE UNITED STATES, AND EMPLOYEES (EXCEPT RELIEF CLIENTS), 1935

Jurisdiction	Number	Employees	
		Number	Percentage
Federal government	1	1,049,900	30.5
States	48	377,700	11.0
Municipalities	16,366	1,258,800	36.5
Counties	3,053		
School districts	127,108	756,400	22.0
Towns, townships, and civil divisions..	28,842		
Total	175,418	3,442,800	100.0

time Army and Navy personnel is given by types of political jurisdiction.¹

In reading the figures in the table it is to be remembered that they indicate all employees of public bodies and not just those who are members of an official class of public servants. Data are presented in Table 246 to show the functional distribution of these 3,442,800 workers who are employed at public expense.²

Unfortunately, no breakdown of the 22 per cent who are listed in "other functions" is possible, but in this body of workers are included many of the officials who characterize the

¹ National Resources Committee, *Structure of the American Economy*, Washington, D.C., 1939, pp. 331, 334.

² *Ibid.*, p. 335.

TABLE 246

GOVERNMENT EMPLOYEES DISTRIBUTED BY MAJOR ECONOMIC
FUNCTIONS, 1935

Function Class	Number	Percentage
Education	1,152,400	33.4
Public roads	647,300	18.8
Military service	268,700	7.8
Post office	260,300	7.6
Police department	178,300	5.2
Municipal fire departments.....	79,400	2.3
Municipal power plants.....	19,000	0.6
Municipal street railways.....	9,900	0.3
All other municipal public utilities...	63,600	1.8
All other functions.....	763,900	22.2
Total	3,442,800	100.0

civil service as it is generally known. It is likewise impossible to obtain comparable figures for previous years which will show the trends in public service. That this body of workers has grown is common knowledge. By 1935 it accounted for more than 7 per cent of all gainful workers. Were relief workers included, the percentage would exceed 11 per cent of all gainful workers in 1935. Persons working for public bodies under relief and emergency grants³ in 1935 were distributed as follows:

Agency	Number of Workers on Relief Projects
Civilian Conservation Corps.....	396,000
Works Progress Administration.....	1,156,000
National Youth Administration.....	147,000
All others	413,000
Total	2,112,000

If data concerning public service are scanty, information about the salaries and wages paid to public servants is even more so. In Table 247 the distribution of federal employees is made by range of salaries.⁴

It is apparent at once that the civil servants are not a high-salaried group, for 58 per cent of all federal government workers receive less than \$2,000 a year. In fact, over 30 per cent receive less than \$1,500 a year. But a very considerable body of workers, 36 per cent, receive the above-average remunera-

³ *Public Assistance*, Bureau of Research and Statistics, Social Security Board, Washington, D.C., August 1939, pp. 7, 8.

⁴ Table constructed from figures obtained by the Civil Service Commission, Washington, D.C., August 1939.

TABLE 247

DISTRIBUTION OF FEDERAL EMPLOYEES BY SALARY RANGE, 1937

Yearly Salary Range	Number	Percentage	Cumulative Percentage
Under \$1,000	55,329	7.1	7.1
\$1,000-\$1,500	185,045	23.7	30.8
\$1,500-\$1,800	118,400	15.2	46.0
\$1,800-\$2,000	93,005	11.9	57.9
\$2,000-\$2,200	187,570	24.0	81.9
\$2,200-\$2,500	52,585	6.7	88.6
\$2,500-\$3,000	45,198	5.8	94.4
\$3,000-\$3,500	18,025	2.3	96.7
\$3,500-\$4,000	9,707	1.2	97.9
\$4,000-\$4,500	3,541	0.5	98.4
\$4,500-\$5,000	4,760	0.6	99.0
\$5,000-\$6,000	3,558	0.5	99.5
\$6,000-\$7,000	1,575	0.2	99.7
\$7,000 and over	1,898	0.2	99.9
Total	780,196	99.9	....

tion of from two to three thousand dollars a year. When it is remembered that these workers are steadily employed and their pay is assured, their advantages over most workers in industry are obvious. Only a relatively small percentage, 5.5 per cent, enjoy salaries above \$3,000 a year. With the curtailment of business and other professional opportunities, increasing numbers in the universities are training for this market of professional or highly skilled occupations of public administrators and technicians. That the market is somewhat limited is indicated by the peak employment, in 1937, or 43,064 persons of this high grade. With demands for curtailment of public expenditures, the future of highly skilled, well-paid civil servants is somewhat hazardous, to say the least. But the trend points to an increasing number of such workers in proportion to all civil servants.

Sex Composition of the Public Service Group

The sex composition of this group is given in the following display:

Year	Percentage	
	Males	Females
1870	99.4	0.6
1880	98.0	2.0
1890	97.2	2.8
1900	96.5	3.5
1910	98.7	1.3
1920	98.1	1.9
1930	97.9	2.2

The number of women employed in public service is relatively small. This is due largely to the census classification of workers under the Public Service caption, for if school teachers, librarians, and others were included, the situation would appear different. However, as Public Service now appears, most workers are engaged in either manual-labor occupations on streets and roads, in fire or police protection, or in the Army, Navy, and Marine services. In these occupations there are few places for women workers.

In fact, as reference to Table 241 will show, women public servants are found primarily in the groups of Public Officials and Keepers of Charitable and Penal Institutions, 62 per cent of all women in public service being employed in these two branches. The remainder are spread rather thinly through the other groups, with no women workers listed as soldiers, sailors, marines, or firefighters.

Firemen

Firemen in the Public Service category totaled 73,008 in 1930, which was about 6 per cent of that major occupational classification. Their number has increased rapidly since 1910 as a natural accompaniment of urbanization, the increase in population, and the erection of buildings. So long as this process of development continues there is every prospect for more firemen to be added to Public Service, despite the fact that their efficiency has been greatly increased because of better selection and training of personnel, a wider use of preventive equipment, larger and more effective fire-fighting apparatus, and more rapid and safer means of signaling and transportation. To offset these many improvements must be reckoned the increase in the number of fires and the rise in fire hazards due to the rapid growth of cities and congestion of population.

An indication of the importance of fire protection is found in the reports of the fire underwriters, which cover, of course, only insured structures. The insured risks totaled \$6,394,000,000 in 1880, while by 1930 the amount had advanced to \$117,000,000,000,⁵ a gain of 1,729 per cent in those fifty years. Fire insurance risks increased 150 per cent from 1910 to 1930, while the number of firemen engaged in protecting these insured as

⁵ "Fire Insurance," *Encyclopaedia Americana*, 1937, XI, 237.

well as the many uninsured structures increased only 105 per cent. While it is true that these figures on insurance risks are only a crude measure of the increased demand for fire protection, it is likewise true that they probably reveal a considerable understatement of the situation. The figures presented do show, however, that no disproportionate increase in the number of firemen has been made in comparison with the increase in amount of property to be protected.

Another advantage, which has accrued to owners of property since the modernization of fire-fighting methods and equipment and the development of fire-prevention education, is the reduction of insurance premium rates, from an average of \$1.1116 per \$100 of risk carried in 1900 to \$0.942 in 1930, a decline of approximately 15 per cent.⁶

Yet adequate fire protection has not been established except in a few of the larger cities, and even in these places fire prevention has not received the attention which the loss occurring from devastating fires would warrant. In 1900 the year's loss by fire in the United States was placed at \$142,110,233; by 1930 it had reached the staggering figure of \$501,980,624. Approximately 30 per cent of this amount, or over 150 million dollars worth of the property which was destroyed by fire, was uninsured and represented a loss which, in many instances, owners could ill afford to bear.⁷ The *Journal of Commerce* estimates that the premiums paid for fire insurance amounted to approximately 40 per cent more than the amount that claimants received for losses by fire. The load upon the owners of property, which is reflected through them upon the entire community, resulted in a total premium payment for insurance of \$2,017,500,000 in 1930.⁸ The figures show that well-protected large cities with adequately staffed fire departments suffer less loss by fire than the country in general even though the fire hazard is greater in the more congested areas. In 1932 the per capita loss by fire in the whole country was \$3.21;⁹ in 458 larger cities, having good fire-fighting equipment and personnel, it was \$2.22. In 1936, the per capita loss in the whole country was \$2.05, testifying to the steady improvement of fire-fighting throughout the country; but the cities had made ever

⁶ "Fire Insurance," *Encyclopaedia Americana*, 1937, XI, 237.

⁷ National Board of Fire Underwriters, Report of May 27, 1937.

⁸ *Encyclopaedia Americana*, XI, 237.

⁹ National Board of Fire Underwriters, Report of May 27, 1937.

greater gains, for they had reduced the per capita losses from fire to \$1.40.

Only a small beginning has been made in fire-prevention installations. Public buildings and commercial houses are generally, but not always, equipped with modern fire extinguishers and sprinkling systems. Few owners of private dwellings, especially in the older and more congested parts of our cities, have any means of putting out a fire, and are thus quite dependent upon the fire department. Were fire prevention universally practiced, the number of large fires would be greatly reduced, and the increasing need for more paid fire fighters would probably diminish noticeably. Statistics gathered by the National Board of Fire Underwriters show that in 70 per cent of buildings equipped with automatic sprinklers, these sprinklers extinguished the fires; in 26 per cent more instances they held the fire in check until the fire department equipment arrived.¹⁰

In most cities firemen are under civil service. In small towns where they are on a pay basis, they are usually public servants subject to the will of changing political fortune. A study of salaries and working conditions of city firemen made in 1934 revealed the facts brought together in Table 248.

These firemen have the advantages of tenure, which assures them the salaries stipulated. They work rather long hours and are obliged to be on duty at their stations during working hours. The average working day ranged, for all cities combined, from 8.1 hours for clerical workers to 18.8 hours for chiefs. Privates, who constitute about two-thirds of all firemen, have an average working day of 16.7 hours. However, they are subject to call at any time of the day or night.

Judging by these conditions of work, the permanent employment, and the range of pay received, it is inevitable that more highly qualified persons will seek such positions if private industry does not revive sufficiently to offer more advantageous opportunities for employment. In view of the increasing attention paid to fire prevention and fighting, it is probable that the number of firemen will increase in the immediate future. This service should make an appeal to persons who seek security of tenure at average to above-average pay. Hazards of the occupation have to be considered.

¹⁰ Estimate of National Board of Fire Underwriters, *Bulletin No. 21*, August 1, 1936.

TABLE 248

NUMBER OF FIREMEN, PERCENTAGE OF EACH CLASS, AND AVERAGE ANNUAL SALARIES IN CITIES OF OVER 25,000 POPULATION, 1934*

Occupational Rank	Number	Percentage	Average Salary
Chief of department.....	372	.6	\$3,023
Assistant chief	1,274	2.1	2,886
Captains	5,544	9.2	2,217
Lieutenants	3,898	6.4	2,233
Engineers, engines	1,977	3.3	2,062
Assistant engineers, engines.....	369	.6	1,796
Chauffeurs-drivers	2,382	3.9	1,735
Fire marshals	60	.1	2,724
Assistant marshals	71	.1	2,209
Fire inspectors	278	.5	1,903
Superintendent of machinery....	88	.1	2,388
Assistant superintendent of machinery	47	.1	2,119
Master mechanic	15	.02	2,329
Mechanics-machinists	531	.9	2,004
Superintendent of fire alarms....	200	.3	2,291
Assistant superintendent of fire alarms	91	.2	1,976
Fire-alarm operators	677	1.1	1,882
Fire-alarm electricians	511	.8	1,953
Telephone operators	220	.4	1,587
Secretaries-clerks	169	.3	1,947
Clerical workers	262	.4	1,804
Privates, fire fighters	41,489	68.5	1,975
Total	60,525	99.9	

* G. H. Loudenslager and H. O. Rogers, "Salaries and Working Conditions of Fire Department Employees, 1934," *Monthly Labor Review*, November 1935, p. 1159.

Law-Enforcement Officers

Law-enforcement work can be roughly divided into two parts, civil and criminal, although quite frequently the overlap between the two is so great that the same persons or departments do both. As population became denser, our economy more diversified, and our social and economic problems more numerous and complex, a veritable flood of laws descended upon us, and they continue to pile up seemingly without abatement. The number of sections in the penal code of the federal government increased from 264 in 1900 to 383 in 1930, or 45 per cent.¹¹ "The number of criminal laws enacted in one legislative session in twelve states increased 13 per cent from 1920 to 1930." The regulatory provisions of eight selected cities in-

¹¹ Edwin H. Sutherland and C. E. Gehlke, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 1116 ff.

creased 72 per cent during the ten years from 1920 to 1930. This hints at the increase in laws requiring direct police enforcement. It does not begin to enumerate many civil statutes, such as tax laws which require enforcement by other public officials. Both are on the increase. In the sessions of the state legislatures of seven states meeting in 1929-1930, 39 per cent more criminal laws and 37 per cent more noncriminal laws were enacted than at the legislative sessions held in these same states thirty years before.

Even more significant than these data on the accumulation of enactments is the passage of laws and amendments which clarify and increase the enforcement provisions of already existing legislation. In a study of six selected states Sutherland and Gehlke found¹² that the following conditions prevailed concerning laws which these states passed in 1900 and 1930:

	1900		1930	
	Number	Percentage	Number	Percentage
Criminal laws	223	100.0	312	100.0
New laws	96	43	90	29
Amendments	125	56	213	68
Repeals	2	1	9	3

While not all criminal laws passed result in restriction on personal and social conduct, the majority of them, 84 per cent in 1930, work in that direction and add appreciably to the growing list of duties of enforcement officers.

The enactment of more civil laws likewise adds greatly to the work of law-enforcement officers and courts. One need only mention as an example the traffic laws resulting from the introduction and widespread use of motor-driven vehicles. In California, the automobile is responsible for a third of the state's tax burden,¹³ the creation of the state and district traffic squads, the revolutionizing of the work of the patrolmen, and the more than doubled business of local courts.

The assumption of criminal prosecution by larger administrative units of government has brought about the establishment of the state police and the extension of the work of the Federal Bureau of Criminal Identification and the "G Men." As crime becomes national in scope, owing in large part to the rapid means of transportation and communication, it is likely

¹² *Ibid.*, p. 1117.

¹³ H. Dewey Anderson, *Our California State Taxes*, Stanford University Press, 1937, pp. 263 ff.

that these changes will become even more pronounced. The passage of federal criminal law also has much to do with this movement. Prior to 1910 the federal government did not prosecute certain crimes which it has now taken over as a special duty, namely, white slavery, narcotic drugs offenses, kidnapping and moving of kidnapped persons across state lines, and the interstate transportation of stolen automobiles. The increasing use of federal taxation, such as the income tax, also adds to national law enforcement work.

While it is impossible to determine with any degree of accuracy the cost of crime and of the enforcement of existing laws, and while it is even more difficult to study trends of costs over a period of years, certain well-authenticated testimony bears out the contention that now as never before crime has become large-scale business. Courtney Ryley Cooper, in his thought-provoking popular book, *Here's to Crime*, estimates that the population engaged professionally in crime and living off its proceeds totals not less than three million persons, and that the cost of their activities is not less than fifteen billion dollars a year to the public.¹⁴ He believes that the substance of crime is a mass of intricately woven threads of: political corruption; profit from vice, bunko, thievery, and gambling; glamour, ignorance, warped personalities, low mentalities, and disease; the shift of population to great centers and the congregation in those centers of large foreign-language groups not wholly adjusted to American modes of living; the dependence of so many poor people on ward bosses and "heelers"; the insufferable drabness and the specter of poverty haunting the daily lives of so many working-class families; and the "easy money" to be made from illegal and illicit practices. Until these conditions have been properly treated, increase of crime is inevitable, and more and better-qualified law-enforcement officers will be needed.

Commitments to penal institutions, while not a reasonable indication of the amount and character of crime because they reveal figures only for those who are convicted, show that the number of convicted criminals is growing. In 1910, the number of prisoners received from courts was 29,710; by 1931 a peak number of 71,298 was recorded, which leveled off somewhat thereafter to become 65,723 in 1935.¹⁵ The number of commit-

¹⁴ Courtney Ryley Cooper, *Here's to Crime*, Little, Brown and Company, Boston, 1937.

¹⁵ *Statistical Abstract of the United States*, 1930, p. 76; 1933, p. 76; 1937, p. 74.

ments per 100,000 population increased from 32 in 1910 to 61 in 1931 and rose to 74 in 1935.

While the number of arrests made by law-enforcement officers is growing rapidly, the statistics are too unreliable to permit anything approaching accurate analysis. State prisons are notoriously overcrowded, recidivism is increasing, and the parole system is so undermanned and inadequately financed as to lead in many instances to the increase of crime rather than to the reform of criminals.

All these conditions point to an increasing need for more and better-qualified law-enforcement officers if society is to establish itself firmly on a socially healthy plane. The number of such officers reported in the Census of Occupations reflects not so much the need for their services as it does the enlightenment of the people expressed through public policy. Trends in numbers of law-enforcement officers would seem to indicate that citizens generally are coming to the belief that a much larger law-enforcement force is necessary, and as more persons express this view the number of law-enforcement officers may be expected to increase substantially.

Policemen

The number of policemen listed in the census in 1930 was 131,687, their number having more than doubled in twenty years. In 1910 there was one policeman for every 1,483 persons in the United States and by 1930 one for every 932. Most of the work done by the police is in preserving the peace and controlling traffic on city streets.

The newest reform of great importance has been the introduction and extension of state police systems. By 1931, thirty-eight states reported¹⁶ forty-seven such organizations, divided as to states and types of systems as follows:

Regular Police Systems (10 states): Connecticut, Massachusetts, Michigan, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Texas, West Virginia

Highway Criminal Police (9 states): Colorado, Florida, Idaho, Maine, Maryland, Mississippi, Delaware, Illinois, Indiana

Highway Traffic Police (21 states): Arkansas, California, Connecticut, Georgia, Iowa, Kansas, Louisiana, Minnesota, New Hampshire, New Jersey, North Carolina, Pennsylvania, Missouri, South Carolina, South Dakota, Tennessee, Utah, Vermont, Virginia, Washington, Wisconsin

¹⁶ Edwin H. Sutherland and C. E. Gehlke, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 1140-41.

State Sheriff Systems (4 states): Nebraska, South Dakota, Tennessee, Wyoming

Governor's Reserve Forces (3 states): Alabama, Louisiana, South Carolina

The effectiveness of these state bodies is becoming so well recognized and their need so completely demonstrated that there is a growing tendency for them to make most of the criminal investigations and even to become general administrative officers. For example, in Connecticut state policemen now act as fire wardens. This opens up a whole new area of public service for law-enforcement officers which has hitherto been reserved to other public officials, and as such service expands demands for more policemen may well be expected to result.

A noticeable trend toward specialization within the police service has occurred. The criminal and detective bureaus have long been specialized. But the technique of traffic control is now taught to a special detail of police; criminal identification bureaus have been set up, and special divisions or squads, dealing with health enforcement, patrolling of residence and business districts, court duty, and rioting, have been established. New types of equipment have changed the character of police work. The territory which policemen can cover has been greatly increased by the use of automobile and radio signaling devices, and new methods of apprehending criminals have been introduced. Armored cars, tear-gas bombs, machine guns, and even airplanes are now used in place of the more primitive equipment of earlier days. The teletype and telephone and the central identification bureau in Washington and in some state capitals have greatly improved the efficiency of police.

But perhaps of even more importance have been the much higher standards of entrance into police work demanded of applicants. This movement is new and, judging by the prevailing educational and training level of policemen, the number of replacements by superior qualified persons will be substantial. Such replacement is hindered in considerable part by the inflexibility of civil-service laws which protect the tenure of policemen and by the spoils system in politics. New entrants, however, will increasingly come from better-schooled applicants, it appears.

In a survey of 294 cities in the United States made in 1934, it was found that the average entering salary of policemen was

\$1,686, the range being from \$960 to \$3,000.¹⁷ The same range was found in the maximum pay possible, but the average maximum salary received by policemen was \$1,941. The period required to secure maximum salaries varied greatly, ranging from 5 to 15 years' service. Forty-five per cent of the cities reporting permitted retirement of policemen on part-pay after 25 years of service; slightly more than 8 per cent had no retirement provision; and the remainder had a variety of plans. A few cities required 12 hours on duty and 12 off, but most of them prescribed a 48-hour working week. Eighty per cent of these cities granted two weeks or 15 days a year with pay for vacation, although a few granted as much as 36 to 40 days.

In view of the expanding opportunities in police work, the above-average pay received in most cities, the general hazardous conditions of private employment in industry, the increasing prestige of the police gained by better personnel selection and higher training standards, it seems probable that the number of policemen will increase. The service offers an opportunity for steady employment at reasonable pay on the skilled to semiprofessional level for an increasing number of college graduates.

Sheriffs

In American social development the sheriff has been established as an elective officer who, at one time, had almost complete control of law enforcement in areas designated as counties. However, as cities grew in size and in taxable wealth, the tendency was to strengthen the city police force at the expense of the county sheriff's office. This has reached the point where many county enforcement offices are undermanned, so that county law enforcement is markedly inferior to that of cities within these counties.

While the number of sheriffs totaled 15,338 in 1930, the increase has not been commensurate with that recorded in the number of policemen. Although the immediate future should show an increased number of sheriffs, as indicated by the trend of occupations and the expansion of duties, the distant future is less hopeful, especially in view of the pronounced trend toward concentration of police authority in larger administrative units, such as states.

¹⁷ Citizens Budget Commission, Inc., New York, *Report on Compensation, Conditions of Employment and Retirement of Police and Firemen, 1934*, pp. 13-14.

Probation and Truant Officers

The census segregates these officials for the decades since 1910. Their number has increased in each decade, being 4,270 in 1930. In view of the better scientific analysis of delinquency and the development of crime prevention and treatment activities, though manifestly slow, it is quite likely that the number of truant and probation officers will continue to increase. When society becomes aware of the usefulness of such officers it is possible that a very substantial growth may be experienced.

Marshals and Constables

These officers were of great importance during territorial days when as federal and local agents they sought to preserve law and establish order. Marshals and constables have declined in importance as civil-law-enforcement officers, except in a few backwoods communities, where they still retain some criminal-law-enforcement functions. In many places they are sustained at the present time, not by any peculiar function they render which could not be incorporated in other branches of the public service, but by law and entrenched political power which successfully resists changes in the law. While their number increased during the 1920-1930 decade, their proportion of the national labor force has not and there is little prospect that it will in the immediate future.

Detectives, Guards, and Watchmen

The numbers of detectives and of guards and watchmen have increased rapidly since 1910. By 1930 the number of detectives was 12,865, and that of guards and watchmen 148,115. Both reflect the employment by private industries of more persons to protect their property, to detect infractions of their rules, and to enforce their administrative decisions. Details concerning the distribution of these private police are not available, but Sutherland and Gehlke suggest an estimate that private police in the industrial city of Chicago outnumber municipal police.¹⁸

Many states license guards, policemen, and detectives, thus seeking both to legitimize and to regulate their activities. Industrial policemen and guards employed in factories and work-

¹⁸ Sutherland and Gehlke, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 1140.

shops are usually deputized by the local authorities, and in case of need may be called to the aid of the public law-enforcement officers. In the usual conduct of their work, private policemen are apparently essential to industry in keeping order, regulating plant traffic, guarding payrolls, preventing theft, and quelling disturbances.

In a more doubtful field of activity, such as was disclosed by the La Follette Senate Investigating Committee on the use of industrial detectives and police, these officers, frequently referred to as "labor spies," are used to prevent the unionization of plants, to dismiss labor leaders, to develop a blacklist which prevents labor leaders from securing employment either in the plant from which they have been dismissed or in other plants, to foment labor trouble and strikes for the purposes of locking out undesirable workers, and so forth. Such private police frequently develop a "racket" in which they not only prey upon the workers but upon their employers as well.¹⁹

In view of the growth of industry, the increasing size of business institutions, the great toll taken from business by crime, the trend of urbanization, and the trends revealed in the Census of Occupations, it is quite probable that the number of guards, watchmen, and detectives will continue to increase.

Soldiers, Sailors, and Marines

The number of such persons depends entirely upon public policy at any given time. The trends of the years since 1870 indicate the permanent peacetime force of defense. Figures for this group represent only fully employed persons, and do not take account of the number of reserves in the several branches of service or the national guard. The defense force prior to 1900 was admittedly inadequate. The enormous gain from 1910 to 1920 represents a new public policy toward defense and also an increase in armed forces which had not been completely liquidated to peacetime strength after the World War. The 1930 number is to be regarded as the complement of our modern peacetime Army, Navy, and Marines. However, with the expansion of a national defense program this number will be considerably increased.

¹⁹ 75th Congress, 2d Session, Report No. 46, Part 3, "Violations of Free Speech and Rights of Labor—Industrial Espionage," Report of the Committee on Education and Labor, Pursuant to S. Res. 266, 74th Congress.

Public Service Workers in Road and Street Building and Maintenance

Numerically, the most important group of public service workers is made up of the road and street building and maintenance workers, who range from street cleaners to foremen and overseers of construction. While the nature of the work performed has greatly changed from the days of dirt roads, the number in this group has increased rapidly since 1910. The mileage of public roads and streets has increased from 2,228,042 in 1914 to 3,009,066 in 1930. The number of miles of surfaced roads and streets has increased from 229,219 in 1914 to 693,559 in 1930. Repairs and changes are continually taking place, requiring a permanent force of workers making and supervising such construction. Equipment has been greatly improved, and the relative output of workers has enormously increased.

Yet because of the greatly extended mileage of roads and streets, the number of construction and maintenance workers shows no signs of declining. In fact, with transportation and communication increasingly dependent upon motor vehicles which use surfaced roads, it is inevitable that, as funds permit, further extensions in the road system will be made, and larger numbers of construction and repair workers will be required. (See chapter vi, above.)

Keepers of Charitable and Penal Institutions

The number of persons listed as Keepers of Charitable and Penal Institutions was 15,020 in 1930. Their number has more than doubled since the first separate enumeration of them in the census of 1910, indicating the emphasis which has been placed upon such institutions as our complex civilization has developed, more persons requiring institutional care or segregation.

There is a well-recognized undersupply of institutions of this character in most states, with waiting lists of feeble-minded, pre-delinquents, and charitable cases. Penal institutions are notoriously overcrowded, and both the states and the federal government are building new prisons. Public insane hospitals are likewise unable to care adequately for all eligible citizens.²⁰ In view of these facts it can be expected that, as funds

²⁰ Certain facts supporting these statements are offered in H. Dewey Anderson, *Our California State Taxes*, Stanford University Press, 1937, pp. 36-38, and in National Commission on Law Observance and Law Enforcement, *Report on Penal Institutions, Probation and Parole*, Bulletin No. 9, June 1931, pp. 11 to 296.

permit and enlightened public policy asserts itself, more institutions will be built, for whom keepers will have to be employed. Thus, as times goes on, the number of such public officials probably will continue to grow.

County Agents and Farm Demonstrators

The census segregated such workers only in the 1930 enumeration, when their number totaled 5,597, or .5 per cent of all workers in public service. While not a new occupation, that of farm demonstrator or county agent has become of greater importance since 1910. More and more professionally trained agriculturalists are being employed in this work; they maintain close relationships with the state and federal agricultural agencies, keep statistics of local farm conditions, give advice concerning farm problems, and attempt in every legitimate way to improve the conditions of farming. There is every reason to believe that this experiment in rural education will continue to grow, with more county agents and farm demonstrators appearing in the next census.

Abstracters, Notaries, Justices of the Peace

This collection of public-service officials is made up of quite unlike occupations. Abstracters are engaged in clerical work in county and city offices, checking property tax rolls, and similar work. They are usually constitutional officers, and their number is arbitrarily fixed. As public administration becomes more professional, these workers tend to become civil-service employees. Instead of an increase in numbers of abstracters, the tendency is to enlarge the clerical personnel. Public-service notaries are officers designated to attest public documents. Private notaries attest both public and private documents, and are licensed by the state. In some localities the number of notaries is fixed by law. Justices of the peace are elective officers, conducting the lowest level of courts. As township duties have lessened, the number of justices of the peace has declined and, especially in sparsely populated areas, relatively few of them have full-time work in public service.

While the number of workers in the heterogeneous group of Abstracters, Notaries, and Justices of the Peace shows some increase since 1910, the gain in the last ten years is not great, and because of what is occurring within public administration

it is likely this slackening in the rate of increase presages an actual decline in the number of these workers.

Public Officials

Besides those public officials separately enumerated by the census, there is a collection of many different officers classed as "Public Officials." In 1930, there were 130,095 persons listed in this group. They range from elective and appointive officers, administering federal, county, and city governments, to inspectors of garbage disposal and other petty local officials. Their number has been growing rapidly since 1910.

Other Public Service Workers

This is a miscellaneous group among whom are distinguished lifesavers and lighthouse keepers. No census segregation was made for 1930, but in 1920 and in 1910 the division was as follows:

	1910	1920	1930
Total Other Public Services..	10,268	21,453	41,637
Lifesavers	2,158	2,287	.....
Lighthouse keepers	1,593	1,463	.....
Other occupations	6,517	17,703	.....

This group gained 305 per cent from 1910 to 1920. The number of workers in these miscellaneous occupations is growing rapidly.

Other Public Service Laborers

Besides laborers in the public service which have been previously enumerated, there is a collection of many types of laborers working for the government. This group totaled 147,847 in 1930, and has been growing quite rapidly since 1910.

CHAPTER IX

PROFESSIONAL SERVICE

General Characteristics (Tables 249 to 254, Charts 1, 6, and 13)

Professional workers numbering 2,927,322 persons in 1930 were 6 per cent of all gainful workers in the United States. They were divided into eighteen groups as follows:

Group	Percentage
Actors and Showmen.....	2.6
Architects .....	.8
Artists and Art Teachers.....	2.0
Authors, Editors, and Reporters.....	2.2
Chemists, Assayers, Metallurgists.....	1.6
Clergymen	5.1
Dentists	2.4
Designers and Draftsmen.....	3.5
Lawyers, Judges, and Justices.....	5.5
Musicians and Music Teachers.....	5.6
Photographers	1.4
Physicians and Surgeons.....	5.5
Teachers and Professors.....	38.4
Technical Engineers	7.7
Veterinarians .....	.4
Other Professional Pursuits.....	3.7
Semiprofessional Pursuits	5.9
Attendants and Helpers.....	5.8
Total	100.1

Except for the Teachers and Professors group, which contains over a third of all professional persons, no single group predominates. In fact, in the other seventeen groups the range is from .4 per cent to 7.7 per cent of professional workers.

Professional workers are divided into numerous groups, each distinct from the other in training and performance, but classed as "professions" largely because of prolonged vocational training.

Most professional workers are highly favored in comparison with the whole body of gainful workers. But there are wide differences among them. The standard professions of law, medicine, and the church comprised the professional class prior to the Civil War, but in 1930 they were only 16.1 per cent of the Professional group. Some of the newer professions, such as architects, designers, and engineers, have become important members of the professional family.

PROFESSIONAL SERVICE

TABLE 249

NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE AND FEMALE, IN PROFESSIONAL SERVICE, 1870-1930

Group	1870	1880	1900	1910	1920	
Teachers, College Presidents, and Professors	126,822 38.2	227,710 41.9	347,344 39.4	446,133 38.9	614,905 38.1	795,173 39.8 1,124,520 38.4
Musicians and Music Teachers	16,010 4.8	30,477 5.6	62,155 7.0	92,174 8.0	139,310 8.6	130,265 6.5 165,128 5.6
Actors and Showmen	3,230 1.0	7,416 1.4	27,783 3.2	34,760 3.0	48,393 3.0	48,172 2.4 75,296 2.6
Artists and Teachers of Art	4,081 1.2	9,104 1.7	24,873 2.6	34,104 2.2	35,402 2.1	57,265 1.8 2.0
Designers, Draftsmen, and Inventors	1,286 .4	2,820 .5	9,391 1.1	18,943 1.6	47,449 2.9	70,651 3.5 102,730 3.5
Architects	2,017 .6	3,375 .6	8,070 .9	10,581 1.0	16,613 1.0	18,185 .9 22,000
Photographers	7,568 2.3	9,990 1.8	20,040	26,941 2.3	31,775 2.0	34,259 1.7 1.4
Authors, Editors, Reporters, Journalists, and Literary Persons	6,265 1.9	2.5	28,563 3.2	40,035 3.5	38,750 2.4	40,865 2.0 64,293 2.2
Clergymen	43,874 13.2	11.9	88,203 10.0	111,638 9.7	118,018 7.3	127,270 6.4 148,848 5.1
Lawyers, Judges, and Justices	40,736 12.3	64,137 11.8	10.2	114,460 10.0	114,704 7.1	122,519 6.1 160,605 5.5
Physicians and Surgeons	62,448 18.8	85,671 15.8	104,805 11.9	132,002 11.5	151,132 9.4	150,007 7.5 159,920 5.5
Dentists	7,839 2.4	12,314 2.3	17,498 2.0		2.5	56,152 2.8 71,055 2.4
Veterinarians	1,166 .4	2,130 .4	6,494 .7		11,652 .7	13,494 .7
Chemists, Assayers, and Metallurgists	772 .2	1,969 .4	4,503 .5	8,847 .8	16,273 1.0	32,941 1.6 47,068 1.6
Technical Engineers	7,374 2.2	8,261 1.5	4.9		88,755 5.5	136,121 6.8 226,249 7.7
Other Professional Pursuits	701		1,569	5,701 .5	15,677 1.0	33,706 1.7 108,796 3.7
Semiprofessional and Recreational Pursuits					67,904 4.2	122,274 6.1 171,773 5.9
Attendants and Helpers					18,601 1.2	31,712 1.6 170,884 5.8
Total	332,170 100.1	543,511 100.1	100.1	1,148,155 100.0	1,614,012 100.0	1,999,168 99.9 2,927,322 100.1

TABLE 250

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN PROFESSIONAL SERVICE, 1870-1930

Group	1870	1880	1900	1910	1920	
Teachers, College Presi- dents, and Professors...	42,775 17.8	73,335 19.9	101,278 17.7	118,519 16.4		145,857 12.8 ^a 244,111 14.4
Musicians and Music Teachers	10,257 4.8	17,295 4.7	27,636 4.8	54,832 5.5 5.7	57,587 5.1	85,517 5.0
Actors and Showmen	2,438 1.0	5,413 1.5	23,200 4.1	27,903 3.9	35,293 3.7	33,818 3.0 54,511
Artists and Teachers of Art	3,669 1.5	7,043 1.9	11,681 2.0	13,852 1.9	18,675 1.9	20,785 1.8
Designers, Draftsmen, and Inventors	1,273 .5	2,764 .8	10,066 1.6	18,002 2.5	44,437 4.6	93,518 5.5
Architects	2,018 .8	3,358 .9	8,048 1.4	10,481 1.5	16,311 1.7	18,048 1.6
Photographers	7,330 3.1	9,539 2.6	17,839 3.1	26,811 3.2	27,140 2.8	31,163 2.4 1.8
Authors, Editors, Report- ers, Journalists, and Literary Persons	6,071 2.5	12,831 3.5	24,950 4.4	32,106 4.4	32,511 3.4	46,922 2.8
Clergymen	43,807 18.2	64,533 17.5	87,060 15.2	108,265 15.0	117,333 12.2	125,483 11.1
Lawyers, Judges, and Justices	40,731 17.0	64,062 17.4	89,422 15.6	113,450 15.7	114,146 11.9	120,781 10.7
Physicians and Surgeons ..	61,921 25.8		100,248 17.5	124,615 17.2	142,117 14.8	141,125 12.5
Dentists	7,815 3.3	12,253 3.3	17,161 3.0	38,748 4.0	54,323 4.0	
Veterinarians	1,166 .5	2,130 .6	6,492 1.1	8,149 1.1	11,052 1.2	13,493 1.2
Chemists, Assayers, and Metallurgists	772 .3	1,921 .5	4,464 .8	8,599 1.2	15,694 1.6	31,227 2.8
Technical Engineers	7,374 3.1	8,261 2.2	43,115 7.5	43,155 6.0	88,744 9.8	136,080 12.0
Other Professional Pur- suits	647 .3		1,090 .2	3,376 .5	7,585 .8	14,441 1.3
Semiprofessional and Re- creational Pursuits					49,679 5.2	7.3
Attendants and Helpers ...					10,315 1.1	14,681 1.3
Total	240,062 100.0	367,977 99.9	572,770 100.0	722,506 100.0		1,132,216 100.1

Reduced .1 to .8 from .9.

PROFESSIONAL SERVICE

TABLE 251

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS IN PROFESSIONAL SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Teachers, College Presidents, and Professors .	{ 84,047	154,375	246,066	327,614	480,985	649,316	
	{ 91.2	88.0 ^a	79.6	77.0	73.4	74.9	71.6
Musicians and Music Teachers	{ 5,753	13,182	34,519	52,359	84,478	72,678	79,611
	{ 6.2	7.5	11.2	12.3	12.8	8.4 ^b	6.5
Actors and Showmen	{ 792	2,003	4,583	6,857	13,100	14,354	20,785
	{ .9	1.1	1.5	1.6	2.0	1.7	1.7
Artists and Teachers of Art	412	2,061	10,815	11,021	15,429	14,617	21,644
Designers, Draftsmen, and Inventors .....	.4	1.2	3.5	2.6	2.4	1.7	1.8
	13	56	305	941	3,012	7,664	9,212
			.1	.2	.5	.9	.7
Architects		17	22	100	302	137	
Photographers		451	2,201	3,580	4,964	7,119	8,366
			.7			.8	.7
Authors, Editors, Reporters, Journalists, and Literary Persons	194		3,613	7,929	6,239	8,786	17,371
			1.2	1.9	1.0	1.0	1.4
Clergymen			1,143	3,373	685	1,787	3,276
		.1	.4	.8	.1	.2	.3
Lawyers, Judges, and Justices		75	208	1,010	558	1,738	3,385
			.1	.2	.1	.2	.3
Physicians and Surgeons	{ 527	2,432	4,557	7,387	9,015	8,882	8,888
	{ .6	1.4	1.5	1.7	1.4	1.0	.7
Dentists	{ 24	61		807	1,254	1,829	1,287
	{ .			.2		.2	.1
Veterinarians	{			14			
	{						
Chemists, Assayers, and Metallurgists	{	48			579	1,714	1,905
	{ ....			.1	.1	.2	
Technical Engineers	{		124	84	11		113
	{ ....		....^c		....^c		
Other Professional Pursuits	{ 54	479		2,325	8,092	19,265	
	{ .1			.5	1.2	2.2	5.7
Semiprofessional and Recreational Pursuits	{				18,225	40,055	47,724
	{				2.8	4.6	3.9
	{				8,286	17,019	55,625
Attendants and Helpers .					1.3	2.0	4.5
Total	{ 92,117	175,534	309,013	425,649	655,214	806,952	1,228,940
	{ 99.9		100.1	99.9	100.1	100.0	100.1

^a Raised .1.^b Reduced .1.^c Less than .001 per cent.

TABLE 252

PERSONS IN PROFESSIONAL SERVICE: PERCENTAGE OF TOTAL POPULATION,
AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population ....	.861	1.084	1.408	1.511	1.755	1.891	2.384
All gainful workers, male and female...	2.656	3.125	3.878	3.949	4.229	4.804	5.995
[Males of] All male gainful workers	2.250	2.496	3.043	3.042	3.186	3.424	4.460
[Females of] All female gainful workers	5.016	6.631	7.894	8.002	8.113	10.140	11.430

The gain from 1870 to 1930 for all professions was 781 per cent, which was practically that of the largest group—Teachers and Professors. This appears in Table 253 which records the rate of growth of the several professions.

TABLE 253

RELATIVE INCREASE OF PROFESSIONAL OCCUPATIONS, 1870-1930

Profession	Percentage Increase		
	1870-1900	1900-1930	1870-1930
Actors and showmen.....	976	117	2,231
Architects	425	108	991
Artists and art teachers.....	510	130	1,303
Authors, editors, and reporters..	539	61	926
Chemists, assayers, metallurgists	1,046	432	5,997
Clergymen	155	33	239
Dentists	278	140	806
Designers and draftsmen.....	1,373	442	7,888
Lawyers, judges, and justices...	181	40	294
Musicians and music teachers...	476	79	931
Photographers	257	47	423
Physicians and surgeons.....	111	21	156
Teachers and professors.....	252	152	787
Technical engineers	486	423	2,968
Veterinarians	600	45	917
Other professional pursuits.....	713	1,808	15,420
Semiprofessional pursuits .....	...	...	...
Attendants and helpers.....	...	...	...
All professions	246	155	781

* No figures.

It is at once apparent that the rate of growth of the Professional Service group as a whole has slackened perceptibly, the thirty years from 1870 to 1900 showing a gain of 1.58 times that of the thirty years from 1900 to 1930. During the former period

there was a gain of 815,976 new professional workers, while during the latter about double that number, or 1,779,167, were added. In the sixty years from 1870 to 1930 the Professional Service group exceeded all other major occupational classifications in rate of increase except Clerical, Public Service, Trade, and Transportation and Communication. However, this phenomenal development was not the same for all groups within the Professional Service group.

Teachers and Professors is the predominant professional group, and its numerical increase during the sixty-year period was quite substantial. The older professions of law, medicine, and clergy stand apart from other professions, having had a relatively much smaller gain. In fact, medical doctors made the smallest numerical gain of any professional group and were closely followed by clergymen and the legal profession.

The emphasis on commercial amusements is reflected in the very great percentage gain in number of actors and showmen. Artists and art teachers experienced substantial increases. But it has remained for the professions directly related to industrial production to show the most startling development. The numbers of technical engineers, chemists, and designers and draftsmen have each increased several thousand per cent in the sixty-year period. The greatest percentage gain in the number of chemists and designers and draftsmen was recorded from 1870 to 1900; but the years from 1900 to 1930 showed smaller gains. The number of technical engineers, on the other hand, maintained a very substantial rate of increase throughout the sixty years.

In comparison with the total population and the total of gainful workers in the United States, the number of professional persons has increased as shown in Table 254.

TABLE 254

PERCENTAGE INCREASE IN TOTAL POPULATION, TOTAL OF GAINFUL WORKERS, AND TOTAL NUMBER OF PROFESSIONAL PERSONS, 1870-1930

Census	Total Population	Total Gain- ful Workers	Professional Persons
1870 .....	....	....	....
1880	30.1	39.1	63.6
1890	24.8	30.7	62.2
1900	21.3	27.9	30.2
1910	21.0	31.3	40.6
1920	14.9	9.0	23.9
1930	16.1	17.3	46.4
1930 over 1870.	218.4	290.5	781.3

It is apparent from this table that the professional occupations have attracted an increasing proportion of the population and of the national labor force, for in every decade the rate of increase of the Professional Service group has exceeded the rate of increase in both the total population and the total of gainful workers of the nation. In fact, in the sixty-year period, the number in Professional Service increased 3.58 times as fast as the entire population and 2.69 times as fast as the national labor force. This remarkable growth gives some indication of the cultural development of the United States, its educational advancement, and the increasing dependence upon higher forms of labor for its economic and social well-being.

From only .8 per cent of the total population and 2.6 per cent of all workers in 1870, the Professional Service group increased rapidly in each decade to become in 1930 2.3 per cent of the entire population and 5.9 per cent of all workers. Thus not only in rate of growth has this group increased but also in relative position within the population.

Sex Composition of the Professional Service Group

As to sex composition the Professional Service group has changed as follows:

Census	Percentage	
	Males	Females
1870	72.3	27.7
1880	67.8	32.3
1890	65.1	35.0
1900	62.9	37.1
1910	59.4	40.6
1920	56.6	43.3
1930	58.0	42.1

From approximately a fourth of all professional persons in 1870, women advanced until they became 43 per cent in 1920. The extension of industrial professions employing mostly males and the increase in the number of male school teachers, especially on the secondary school level and above, have tended to reduce the proportion of females in the total Professional Service group during the ten years from 1920 to 1930.

Women are found in all major professional pursuits. In occupations such as architects, technical engineers, and veterinarians, their number is very small; but in others, such as teachers and artists and art teachers they are a very substantial part of the total. Whereas by 1930 the number of males in the

professions had multiplied six times since 1870, the number of females had multiplied twelve times. The sex composition of the groups making up the various professions may be seen in Table 255.

TABLE 255
SEX COMPOSITION OF THE SPECIFIC PROFESSIONS, 1870-1930

Profession	Percentage							
	1870		1900		1930		1930 Increase over 1870	
	Male	Fe-male	Male	Fe-male	Male	Fe-male	Male	Fe-male
Actors and showmen .....	....	....	....	....	72.4	27.6	....	....
Architects	99.9	.05	99.1	.9	98.3	1.7	973	37,800
Artists and art teachers	89.9	10.10	55.7	44.3	62.2	37.8	871	5,158
Authors, editors, and reporters	99.9	3.10	80.2	19.8	73.0	27.0	673	8,854
Chemists, assayers, and metallurgists	100.0	....	97.2	2.8	96.0	4.0	5,750	....
Clergymen	99.8	.20	97.0	3.0	97.8	2.2	232	4,790
Dentists	99.7	.30	97.3	2.7	98.2	1.8	793	5,268
Designers and draftsmen	99.0	1.00	95.0	5.0	91.0	9.0	7,246	70,762
Lawyers, judges, and justices	100.0	.01	99.1	.9	97.9	2.1	286	67,600
Musicians and music teachers	64.1	35.90	43.2	56.8	51.8	48.2	734	1,284
Photographers	97.0	3.00	86.7	13.3	78.8	21.2	325	3,569
Physicians and surgeons	99.2	.80	94.4	5.6	94.8	5.2	145	1,492
Teachers and professors	33.7	66.30	26.6	73.4	21.7	78.3	471	948
Technical engineers	100.0	....	99.8	.2	99.9	.1	2,967	....
Veterinarians	100.0	....	99.8	.2	99.9	.1	917	....
Other professional pursuits	92.3	7.70	59.2	40.8	36.2	63.8	5,982	128,509
Semiprofessional pursuits .....	....	....	....	....	72.2	27.8	....	....
Attendants and helpers .....	....	....	....	....	67.4	32.6	....	....
All professions	72.3	27.70	62.9	37.1	58.0	42.1	608	1,234

In comparison with males, women have made unusual gains in their percentage of artists and art teachers, authors, editors, and reporters, designers, music teachers, photographers, and school teachers. Although females comprised approximately half of the number of musicians and music teachers in 1930, they also constituted over half of the labor force in the teaching profession. In the group designated "Other Professional Pursuits" in the census, which includes a variety of new occupations, women moved from a minor fraction in the earlier decades to almost two-thirds of the group in 1930. A fifth of photographers were women and more than a fourth of all workers listed as actors and showmen, artists and art teachers, authors, editors and reporters, the semiprofessions, and professional attendants were women. In other professions they constituted a very minor part of the number of workers.

Few women were found among architects, dentists, lawyers and judges, clergymen, technical engineers, and veterinarians. Men made up approximately 95 per cent of all chemists and assayers and of physicians and surgeons. While the percentage of men decreased somewhat in some of these professions during the decade 1920-1930, the loss was recovered among artists, dentists, musicians, photographers, and the group designated "Other Professional Pursuits." Whether or not this trend will continue cannot be determined because of the short period of time under review.

In actual numbers, males increased 482,444 from 1870 to 1900 and females increased 333,532. From 1900 to 1930 both sexes increased in number with startling rapidity, males increasing 975,876 and females 803,291. Much of this gain for women has been in the teaching profession, and while male teachers also increased substantially, the greatest numerical expansion among professional males has been in the technical-engineering fields.

In 1930 the sexes were distributed among the various professions in unlike proportions. While it is true that teaching comprises 38 per cent of all professional workers, it serves as a field of endeavor for only 14 per cent of professional males. Nevertheless, teaching engages the attention of a larger number of men and women than any other type of professional work. Among men, engineering is second with 13 per cent in 1930. The second most important professional group for women is Musicians and Music Teachers, with females making up 6.5 per cent in 1930. Within the Professional group, in no other occupation in which men engage are they as much as 10 per cent of the total, and among women there is no other single professional occupation in which 5 per cent are listed.

Teachers, College Presidents, and Professors (Table 256)

The number of teachers and school officials totaled 1,124,520 in 1930; they were .9 per cent of all inhabitants, 2.3 per cent of all gainful workers, and 38 per cent of all professional persons. No other subgroup made up as much as 8 per cent of the Professional Service group. For the decades 1910-1930 this very important body of workers can be segregated into general school teachers, teachers of special subjects such as athletics, drawing, shop, and so forth, college presidents, and professors. The data are submitted in Table 257.

TABLE 256

TEACHERS, COLLEGE PRESIDENTS, AND PROFESSORS: PERCENTAGE OF TOTAL POPULATION, AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population ....	.329	.454	.555	.587	.669	.752	.916
All gainful workers, male and female...	1.014	1.309	1.528	1.535	1.611	1.911	2.303
[Males of]							
All male gainful workers .....	.401	.497	.538	.499	.445	.441	.641
[Females of]							
All female gainful workers	4.577	5.832	6.286	6.159	5.956	7.595	8.188

TABLE 257

DETAILED ANALYSIS OF THE TEACHING FORCE, 1910-1930

	1910	1920	over 1910
Number of school teachers ...	595,306	752,055	1,044,016
Percentage increase .....	....	126.3	38.8
Number of special teachers ..	3,931	9,711	18,599
Percentage increase .....	....	147.0	91.5
Number of college professors	15,668	33,407	61,905
Percentage increase		113.2	85.3

While a great numerical gain has taken place among ordinary school teachers, teachers of special subjects have increased more rapidly. However, both teachers and college professors had a higher percentage gain in the ten years 1910-1920 than in the ten years following.

The teaching force increased 319,311 in the thirty years from 1870 to 1900, but grew at a more rapid rate from 1900 to 1930, increasing 678,387 in that period of time. Its greatest decennial increase was recorded in the 1930 census with a gain of 329,347 teachers. This phenomenal increase was due to the expansion of the teaching force of women in the public elementary schools, and of both men and women teachers in the public high schools.¹

The distribution of this teaching force of men and women in the various kinds of educational institutions in 1930 may be seen in Table 258.

¹ Charles H. Judd, "Education," *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, chapter vii, table on p. 351.

TABLE 258
INSTITUTIONAL LOCATION OF THE TEACHING FORCE IN 1930*

Type of Institution (Public and Private)	Total Number of Teachers	Men		Women	
		Number	Percent- age	Number	Percent- age
Elementary schools	702,524	68,705	9.8	633,819	90.2
High schools	235,094	82,689	35.2	152,405	64.8
Colleges and universities ...	54,195	39,735	73.3	14,460	26.7
Professional schools	16,214	15,562	96.0	652	4.0
Normal schools	14,463	5,995	41.5	8,468	58.5
All schools	1,022,490	212,686	20.8	809,804	79.2

* Table reassembled from Table 22, Charles H. Judd, *op. cit.*, p. 352. The figures are from the official sources of the *Biennial Survey of Education, 1926-1928*, p. 426, and other material supplied by the United States Office of Education.

In 1930 the typical school teacher was a woman working in an elementary school. In fact, elementary schools offered employment for over two-thirds of all professional school teachers. Secondary school teachers as a group accounted for more persons than any profession outside of teaching, and college teachers more than in any of the following professions: actors, architects, artists, editors and reporters, chemists, dentists, photographers, and veterinarians.

The number of teachers in elementary schools increased 63 per cent from 1900 to 1930. Men teachers in elementary schools declined from 28 per cent of that teaching force in 1900 to 9.8 in 1930; women increased from 72 to 90 per cent.

On the high-school level, men teachers decreased from 47 per cent of all secondary school teachers in 1900 to 35 per cent in 1930; women teachers increased from 52 per cent to 65 per cent. However, this was the period of greatest growth in secondary education, the total gain in number of teachers being 671 per cent; that of men alone was 472 per cent, and that of women 850 per cent.

Teachers employed in regular colleges and universities increased 388 per cent in the period 1900-1930. Even at this higher level of learning, women are taking a more important part. Men were 81 per cent of the teaching force at this level in 1900, and only 73 per cent in 1930. Women increased in their proportion of the total from 19 per cent to 26. However, both sexes increased substantially in numbers—men by 342 per cent, and women by 575 per cent.

In the strictly professional schools, the increase in teaching personnel was 96 per cent in the thirty years. There were no women teachers in such institutions in 1900, and only 4 per cent in 1930. Here men teachers have increased in number 88 per cent.

In the normal schools engaged in training teachers, women have always had a prominent part. They maintained their relative position during the thirty years after 1900, changing from 57 per cent of that teaching force in 1900 to 58 per cent in 1930. However, the work of the teacher-training institutions has expanded greatly, the number of teachers in such institutions having increased 231 per cent in the last thirty years. Men teachers increased 222 per cent, and women teachers 237 per cent.

The number of teachers and their distribution among the several kinds of schools in operation throughout the United States depends almost entirely upon public policy. In the days when the "three R's" were considered sufficient book learning for a sturdy pioneer people who had little time and little need for scholastic attainments, a short-term school operated by meagerly trained teachers sufficed. But, in a present-day complex industrial civilization, with a population increasingly engaged in professional, trade, and service occupations, a limited schooling, a poorly trained intellect, and a badly disciplined character are great handicaps to individual success and to the advancement of social, economic, and political culture. Public policy increasingly recognizes these conditions and has continually expanded its program of education under school auspices.

There is little reason to believe that the ultimate development in this direction has been attained, and much reason to believe that even greater demands will be made upon the educational system in the future. The census of 1930 showed that 70 per cent of the population between the ages of 5 and 20 years were in school during the school year.² Or, to place the limits within the range of childhood, 80 per cent of all children between the ages of 6 and 17 years were enrolled in school. That leaves an elementary and secondary school constituency at that time unprovided with school of 20 per cent, or a vast army of children numbering 5,763,951 in 1930.

² *Fifteenth Census of the United States, 1930, "Population,"* Vol. III, Part I, p. 10.

It is estimated that in 1930, while there were 1,694,000 living college graduates, there were 7,437,000 living high-school graduates who had not continued their education and received a college degree. This would mean that in every 1,000 of the adult population there were only 23 persons with a college degree and 102 who had graduated from high school but not from college. About one-eighth of the adult population had continued their education through high-school graduation or beyond.³

Even when the better-schooled children of sixteen major cities are considered, it is reported that in 1929 of children who had entered the school ten years earlier only 50 per cent reached the tenth grade, 28 per cent the eleventh, and 23 per cent the twelfth.⁴

These facts indicate that at all levels of schooling above the lowest grades there is a substantial proportion of the potential school population which is not in attendance at educational institutions, to which should be added those who are eligible for the yet undeveloped nursery and kindergarten schools. These data offer evidence of the need for extensions in our educational system which will require further additions to the teaching force.

Within the existing educational system is abundant evidence of the fact that any rational system of education which actually proves its fullest worth in a truly cultured product can be established only with sharp revisions in methods and organization of instruction in which individual attention to student needs will become paramount. In such a revision of educational practice present large classes and burdensome teaching loads would be eliminated, with the result that more teachers would be needed to adequately man the enterprise. If adult education through classes and forums is to merit public support, it must be much improved and this, too, will require more and better-trained teachers. If the school is to take its rightful place as a vocational training and retraining agency, a larger staff of specialists will be needed.

While the increase in the number of teachers is very marked, the fact is that the gain of 28 per cent in the phenomenal decade from 1920 to 1930 was not equal to the gain

³ *Biennial Survey of Education, 1928-1930*, Vol. II, "Bulletin 1931," No. 26, p. 7, Washington, D.C., 1932.

⁴ E. J. Kline, "Significant Changes in the Curve of Elimination, since 1900," *Journal of Educational Research*, XXVI, 37.

in pupil attendance, which was 317 per cent for the same period of time. Whatever increase has taken place in teaching staffs apparently has been made for the purpose of supplying teachers to meet the larger enrollment of pupils rather than for individualizing and intensifying instruction in an effort to enrich the lives of pupils.

School teachers in different parts of the country, teaching in various kinds of schools, receive widely varying salaries. Judd gave the average annual salary of public-school teachers in the United States in 1930 as \$1,420.⁵ Clark places the figure at \$1,350 as an average for the years 1920-1936 and the median at \$1,220.⁶ Among rural-school teachers in 1932 the average one-room country teacher received \$788, the median rural-school teacher in the United States received \$926, and the highest-paid rural teacher \$1,157.⁷ In city schools the poorest-paid teachers averaged \$1,162, and the median salary paid was \$1,771; the average salary paid teachers working in cities of over 100,000 population was \$2,118.

The majority of teachers receive a level of income approximately that of full-time employed skilled labor. Only in the larger centers and in the rural schools of the wealthier states does the salary paid school teachers represent an exceptionally favored income. Yet the appeal of this occupation is so great, especially to young women who desire genteel work at a professional level, that no lack of candidates is experienced. In fact, the training centers have been forced to erect barriers in order to weed out the less desirable of those who offer themselves for preparation.

Certain advantages accrue to employed teachers which offset considerably the relatively low pay. In some fourteen states tenure laws make it possible for those who are able to surmount the barriers to become permanently employed in what is approximately equivalent to Civil Service. The school term provides relatively long vacations at the most desirable times of the year. The work is of professional character, and has social prestige which is in itself a powerful attraction, especially to those who come from modest homes and aspire to the cultural level of the professional class. As for teaching and

⁵ Charles H. Judd, *Recent Social Trends in the United States*, p. 351.

⁶ Harold F. Clark, *Life Earnings in Selected Occupations in the United States*, Harper & Brothers, New York, 1937, p. 89.

⁷ W. H. Gaumitz, *Status of Teachers and Principals Employed in the Rural Schools of the United States*, Office of Education, Bulletin No. 3, 1932, pp. 57 ff.

administrative positions in the larger centers, both the pay and the prestige place their occupants among the more favored members of society. Finally, with other professional callings closed to worthy but impecunious aspirants who cannot afford the prolonged and costly training, who cannot undergo the long waiting period required to build up a paying practice, and who cannot meet the initial costs of equipment, the teaching profession is most favorable. It permits one to enter at its lower levels without prolonged higher school training; it requires no special money outlay; and it pays a living wage from the beginning day of employment. There is the further possibility of securing additional schooling in summer courses and of qualifying for advanced teaching on a more remunerative and responsible level.

In the better states, however, extensions in the number of school-teaching positions seem to be lessening, and in some instances a policy of replacing only dismissed or resigned teachers is followed. If the purposes of their tenure laws were lived up to in some of these states, few demands for new teachers would be made. Yet the training centers in such states continue to turn out an increasing number of new teachers, who compete on the market with detrimental effect with those already certified for employment. For example, California, which is rated among the first five states in the Union by every measure of educational achievement, has certified teachers to approximately double the number of available teaching positions, although this state has perhaps the highest certification standards in the country.

In the more favored administrative positions, an even more serious condition prevails. In 1931, a typical year of the past ten, 231 administrative credentials were granted the graduate students of university departments of education at a time when the number of administrative positions available totaled 48.^a

It is possible that the pressure of this oversupply of teachers and school administrators in the states where educational positions are more desirable actually does result in the people securing professional services for relatively less money; for it is difficult to raise salaries in the face of a force of qualified unemployed teachers willing to work for the prevailing rate. But the condition also results in much unprofessional conduct

^a Dewey Anderson and Ellis G. Rhode, "Troublesome Situation in California," *The Nation's Schools*, February 1936, p. 34.

in scrambling for the available positions, which very frequently do not go to the best-qualified persons; it breaks down morale, destroys the tenure system, and disrupts the growth of professional life.

Except in a minority of cases, teachers do not occupy the favored economic position that other professionals such as doctors do. Consequently, there is not the same reason for flooding the market in order to obtain more and cheaper services. Only an enlightened public policy and a program of planning for the number and quality of new teachers to be trained can avert the ultimate detrimental effects of present practices.

The situation existing in 1939 is broadly characterized in the quotations^o which follow.

Eliassen and Anderson (in "Teacher Supply and Demand," Review of Educational Research, June, 1937) show that the oversupply of teachers was at its height in 1932 or early in 1933. The teacher-training institutions were slow in adjusting themselves to the depression, but even today, after an adjustment has been made, Evenden, Gamble, and Blue (in "Teacher Personnel in the United States," National Survey of the Education of Teachers, Bulletin 1933, United States Government Printing Office, 1935) report that the number of certified holders without positions is being added to at the rate of more than fifty thousand a year. To contrast this view is the opinion of Frazier (in "The Teachers' College Faces the Future in the Selection of Teachers," Peabody Journal of Education, January, 1935) who would not decrease the number of certified holders but would increase the number of teaching positions. He reminds us of the many children of school age who are not in school, of the classrooms that are crowded with 40 or 50 pupils, and of the inadequacies of adult education. Donovan and Jons (in "Selection of Prospective Teachers," Peabody Journal of Education, November, 1935) are committed to the view that there is underconsumption rather than overproduction of teacher talent.

If the economic pressure on the taxpaying public is lightened, through an economic recovery which will enlarge incomes or through a radical revision of the whole tax system, there is the probability of enlarging the scope of education in both the enlightened and the backward states, and of absorbing the present surplus of trained and available teachers. Even if this does not take place, there is every prospect that teacher-training institutions will continue to accept an appreciable portion of those many persons who apply for training. Therefore, despite the several conditions which might serve to lessen the number of aspirants were opportunities available in other professional occupations, it is quite likely that the number of

^o *Journal of Educational Research*, January 1940, p. 322.

teachers will continue to expand in the immediate future. Only in those rare instances where an undersupply of certified professional teachers exists at present is there room for additions within the employed labor force without displacing those who are already at work. Only if it is certain that new teachers are considerably superior to those whom they seek to displace have training agencies any moral right to continue to flood the market with new teachers.

Just as the high school has expanded rapidly during the two decades ending in 1930, so the junior colleges and universities appear to be on the threshold of a large increase in demand for their offerings. More young people are becoming convinced that chances for occupational success are greatly enhanced by securing a college education. The rapid increases in college enrollments within the ten years preceding 1930 continues without abatement, despite rather trying economic circumstances which limit the amount of money available in many homes for college tuition and other costs.

However, the rapid development of public junior and senior colleges, many of them on a regional basis, has placed free, or nearly free, higher education at the disposal of many more people. The state has acquiesced in the demands of labor groups by maintaining these young people in schools rather than glut the already abundantly supplied labor market with young workers. Only lack of funds prevents a further extension of this development. With it has come a need for more college instructors, the extension of graduate departments for training in the universities, and more research of a professional character as the basis of professional education. This trend is likely to continue for some time to come, with possible momentary halts due to unfavorable economic conditions, and will inevitably mean a further increase in the number of university and college professors and administrative officers.

Musicians and Music Teachers

The number of musicians and music teachers in 1930 was 165,128; this was .13 per cent of the entire population, .34 per cent of all workers, and 5.6 per cent of all professional persons. Both occupations are frequently followed by the same person; hence the census has seen fit to combine the returns which represent the number of persons professionally engaged in either playing or teaching music.

This is one of the few professions in which the number of females has at times exceeded that of males. It was only after 1890, however, that women entered the profession in sufficient numbers to give them predominance. In the decade ending in 1930 changes occurred which resulted in a greater number of male musicians. The developments are indicated by the following figures:

Group	Percentage Increase	
	1900 over 1870	1930 over 1900
Total	475	79
Males	288	114
Females	810	52

In the later period, the increase in number of musicians slackened considerably, owing to the fact that the number of females, who are such a large proportion of the total, failed to increase rapidly. During the decade 1920-1930 only about 7,000 females were added to the group, whereas 28,000 more males became musicians and music teachers.

A partial explanation of these circumstances is found in the fact that as the teaching profession expanded it gave more opportunity for educationally qualified persons among musicians to become teachers. This work was especially attractive to females, and many women who had been music teachers or whose talents inclined in that direction were able to become certified to teach in the public schools.¹⁰ Music teachers engaged in giving private lessons were forced to face the competition of the radio, which tended to take the place of self-entertainment in the home.¹¹ Thus, the number of privately employed female musicians and music teachers declined.

The period after 1900, and particularly from 1910 to 1920, was also unfriendly for male musicians, as a result of music hall, theater, and silent-cinema orchestras. The introduction of jazz and the widespread popularity of dancing and radio

¹⁰ In an NYA study, "Music" (1939), this opinion is expressed: "The public schools have been a great influence on American musical education. Schools are co-ordinating on two goals: improvement in aesthetic standards of music of the amateur, and improvement in educational methods of teaching music." *Life*, December 10, 1938, had this to say: "Today in America 10,000,000 people, most of them in public schools, are studying music. Millions of Americans actually play instruments—in the 156,000 school bands, and in the 260 local symphony orchestras."

¹¹ "There are over 37,000,000 places in the United States where radios can be heard. . . . Sixty-seven per cent of the total of all broadcasting in the United States every 24 hours is music," "Music," *Occupations: A Series of Vocational Studies*, NYA of Illinois (William J. Campbell, State Director), 1939.

broadcasting opened up many opportunities for men musicians, resulting in a substantial increase from the 1920 to the 1930 period. The circumstances of their employment—much of it being night work under trying conditions—has confined these occupations largely to men.

The repeal of Prohibition has also increased the demand for new musicians, with large numbers of night clubs and taverns providing entertainment for their ever increasing clientele. Musicians are one of the most strongly organized labor groups, and maintain their semimonopolistic position in the labor market by high initiation fees and stringent artistic requirements.

The development of the symphony orchestra since 1919 is of striking significance. In 1939, there were 270 such orchestras reported. The so-called major orchestras number 16, but all 270 are of symphonic size, produce symphonic music, and play to large audiences. Financial support has always been a crucial matter with the symphony orchestra. The minor orchestras seem to be able to support themselves by the sale of seats; but this has never been true of the major organizations. These have relied upon wealthy patrons. With the coming of the depression these orchestras have had to appeal to the general public. In some cities millions have been raised by popular subscription, largely by addressing radio audiences. This was conspicuously true of the New York Philharmonic, which received contributions from all the American states and from neighboring countries. The most significant exhibition of popular support was furnished by San Francisco, where the people levied a half-cent increase in the tax rate for the benefit of the Orchestra.

The mounting popularity of symphonic music is beyond question. Whether this will lead to a larger opportunity for musicians is, however, not as yet clear. So far, the radio has made use of a few great orchestras to send symphony music to millions of listeners.¹² If it may be assumed that these millions will one day demand symphony orchestras in many localities, an increase in musicians may be expected. Even if this does not happen, an increased popular interest in good

¹² "The N.B.C. radio symphony programs and the New York Philharmonic Sunday afternoon broadcasts have had a tremendous influence on musical taste. On the air since 1930, the Philharmonic is the largest continuous symphony broadcast in radio. To its Sunday afternoon programs 9,000,000 people listen regularly," "Music," *Occupations—A Series of Vocational Studies*, NYA of Illinois, 1939.

music would seem to point to a larger need of musicians in the long run.¹³

Actors and Showmen

The number of actors and showmen has increased from a mere 3,230 in 1870 to 75,296 in 1930, from .03 per cent of all workers to .15 per cent, and from 1 per cent of all professionals to 2.6 per cent. The past sixty years cover a period of great change in the arts followed by these professional persons. All phases of their work have undergone radical revision. The traveling medicine show, the old-fashioned musicale, the stock company resident in even the smaller cities, the many vaudeville circuits, and the minstrels are largely a part of the almost forgotten past. Instead there is the radio with its sixteen million sets in twelve million homes providing a continuous flow of day-and-night entertainment by professional actors over nation-wide hookups.¹⁴ There are the talking pictures shown daily in 14,161 cinema houses scattered throughout the land made by a corps of 5,542 actors and 17,541 registered extras, most of whom live in the movie colony of Hollywood.¹⁵

Shirley Wells reports later figures as follows:

Eight thousand extras are registered at the Central Casting Bureaus, not counting racial groups and cowboys. Another 8,000 are on call at the Actors' Bureau. . . . An indeterminate number linger on the outskirts of the profession, getting a day's work now and then.¹⁶

There still remains the legitimate drama, confined largely to the great cities but occasionally being taken on road tours. But there has grown up a "little theater" movement with amateur, semiprofessional, and professional casts performing in their own buildings, rented places, or community centers. It is this "little theater" which offers what is increasingly accepted as one of the best means of acquiring that training and skill essential for a professional career in acting.

¹³ Dickson Skinner, "Music Goes into Mass Production," *Harpers Magazine*, April 1939.

¹⁴ Malcolm M. Willey and Stuart A. Rice, "The Agencies of Communication," *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 211.

¹⁵ *Motion Picture Almanac, 1931*, Quigley Publication Company, New York, p. 93. *The Census of Business, 1935*, p. xiv, states that there were then 6,104 proprietors and firm members and 93,052 employees (average yearly number) in 12,024 theaters and motion-picture establishments.

¹⁶ Shirley Wells, "Motion Picture Actors," *Occupations*, February 1937.

In this historical development of the entertainment business many critical periods have been reached which caused great difficulty and hardship to professional actors and showmen and those musicians, scene painters, business agents, costumers, and roustabouts associated with them. Some of these events are reflected in the Census of Occupations. While it is true that actors and showmen have increased in number in the last thirty years under review considerably more than in the first thirty, nevertheless, from 1910 to 1920 the trend leveled off. This coincides with the rapid shift from the vaudeville and legitimate theater to the moving-picture house, and represents the successful struggle of the screen to supplant the stage as a form of popular entertainment. The period spelled hardship to many persons.

Between 1920 and 1930, however, a reverse trend appeared, with a closer relation between entertainment by professional actors and business advertising, which alone has accounted for a remarkable expansion of occupations for actors and showmen. The cinema has grown to large and somewhat stable proportions, cinema-going has become a fixed habit of the people, the pictures are more elaborate and of higher quality and the acting better than formerly. Stars have their following, and as their professional ability becomes recognized, the staging of plays, having more lasting significance, offers greater opportunity to consider acting a life work. In short, the cinema has grown up.

But this does not mean that actors and showmen have an assured occupational future. Many are listed in the census who lead a precarious, not to say a heartbreaking, life. Unemployment, both periodic and of long duration, is common among them. The oversupply of movie extras is a matter of common knowledge and of considerable concern to both the picture-making industry and the social agencies which are forced to make some charitable provision for destitute actors and showmen. In no sense can these occupations be regarded as a "mass occupation" toward which any appreciable number of young people should direct their attention. The demands are so exacting, the requirements for success as a profession so high, that recruits should be found strictly on an individual basis. That the occupation is expanding in numbers attests the growing place which showmen and actors are claiming in social life and in business.

Artists and Teachers of Art

The number of artists and teachers of art has increased rapidly, from 4,081 in 1870 to 57,265 in 1930 and from .03 per cent of all gainful workers in the former year to .12 in 1930. This group has grown more in the last thirty years of the period under review than in the first thirty years, attesting in considerable part the cultural improvement of the nation and its acceptance of art, especially as an acquisition to be made through learning. In fact, the teacher of art has very considerably replaced the music teacher as a home instructor in the modern day of radio and other forms of "canned music." A somewhat uncertain occupational income forces many artists to teach art; and this makes impossible the segregation of artists from teachers in that field, for one is very frequently the other as well.

The fine arts have found new outlets in the construction of public and private buildings where hangings of paintings and wall murals are increasingly accepted. Likewise, discerning people have sought out the better works of American artists for their homes, and the museums have increased the sale of paintings. However, it is in the field of commercial art that occupational opportunities present themselves for those who look upon art as a vocation which must provide a steady income. The number and the size of illustrated magazines have increased rapidly, especially since 1920; cartoons, drawings, showcards, window displays, and posters have become an important part of modern commerce.

That there is little assurance of work for many artists, even under these more favorable present-day conditions, is attested by the fact that the relief program of the state and federal governments made special provision for needy artists and the Federal Art Project was undertaken in 1934 with 900 artists working for a bare subsistence. By March 1936, the number of artists receiving federal aid had reached 5,250.¹⁷ To some

¹⁷ *Government Aid during the Depression to Professional, Technical, and Other Service Workers*, WPA Administrative Report, May 18, 1936, pp. 12-23. See also *Opportunity*, by I. David Cohen and Mary K. Ganley, Thomas Nelson and Sons, 1938, p. 91:

"In the New York Sun, Mr. McBride gives some advice about overproduction in the future. 'A lot of unpreparedness for life on the part of our artists could be ameliorated if some of these committees now engaged in the task of supplying food and woollen garments to starving painters and sculptors would jot down the stories that these unfortunates tell them, get them printed in a neat and succinct form and see that they are placed in the hands of the parents of cute children that betray an aptitude for drawing. Such a procedure would certainly result in lessening the number of artists for the decade to come, and that would be an enormous help, for most of the misery in the art crowd, like most of the misery of the rest of the world, is due to overproduction.'"

artists this aid has proved a boon, providing a steady "meal ticket" which permits them to occupy their time in their chosen vocations. Others among them regard such work as relief and await the return of economic prosperity which will enable them to sell their product on the private market. One hears rumors, however, that a federal arts project might very well be regarded as a permanent form of endeavor through which the government could make possible the development of art for which our private economy has never made adequate provision.

This professional occupation has few standards of remuneration, conditions of labor, or terms of employment. Only in the strictly applied fields of commercial art are there a set wage and exact requirements. Because of these facts, the vocational opportunities should be examined carefully in terms of individual aptitude and inclination. It is probable that, despite the unsettled and unformed conditions prevailing in the field of art, the number of artists and teachers of art will continue to grow; and the trends indicate a substantial increase in the immediate future. But commentators stress the surplus of aspirants in this line of work, and really limit opportunities to the gifted.¹⁸

Designers, Draftsmen, and Inventors

The number of designers, draftsmen, and inventors found in the census of 1930 was 102,730, of whom 20,508 or 20 per cent were designers, 79,922 or 78 per cent were draftsmen, and 2,300 or 2.2 per cent were inventors. The supposed affinity between these occupations is found in their similar purpose to design, draw, or conceive plans for industrial production. The connection is none too close, for the occupations are not identical in operations, income, or social prestige. A strict occupational classification based upon the exactingness of the service rendered would probably place many draftsmen and not a few designers in the skilled or semiprofessional category.

As a census group, these occupations were .21 per cent of all gainful workers in 1930, 3.5 per cent of the professional class. In comparison with the numerical growth of the entire body of American workers, they increased more rapidly during the sixty years preceding 1930, indicating that relatively more

¹⁸ Ellnor S. Thompson, "Opportunities in Art Vocations," *Occupations*, December 1935.

persons were turning their attention to such occupations. As a proportion of all professional persons they had likewise increased steadily from 1870 to 1920 to a position at which they remained in 1930.

When the three occupations are separated, it appears that the number of designers and draftsmen has increased since 1910 but the number of inventors has decreased steadily. This does not mean that invention has declined. The number of patents granted in 1910 was 35,168, while 45,243 were granted in 1930; the number increased to 53,519 in 1932 and declined thereafter to 37,750 in 1937.¹⁹ Rather it seems to imply that the occupation of inventor is no longer followed by so many persons, many of the inventions now patented which have practical or scientific value coming from the scientific and research laboratories manned not by inventors but by scientists and engineers. The increase in number of designers has been much less than that of draftsmen; the former have hardly doubled in number in the twenty years preceding 1930, while the latter have increased almost 2.4 times.

Designers are employed in a variety of businesses—in machine- and toolmaking, in ship- and boatbuilding plants, in printing plants for design and layout work. The field of their operations depends upon the business structure and the economic conditions prevailing. With increasing diversity of industrial activities and growing emphasis on machine operations and mass production, the use of industrial designing has been expanding rapidly. That it will continue to expand and that more workers will be found in this group of occupations seems probable.²⁰ This trend is also borne out by the census.

Draftsmen are required wherever industry requires patterns, drawings, blueprints, and sketches. Draftsmen are used in architects' offices, on building construction, in manufacturing plants, in large offices which require technical drawings, etc. As the industrial structure grows in size and complexity, so the number of draftsmen will increase. This has been the history to date and bids fair to continue in the immediate future. The proportion of draftsmen in the whole body of industrial workers is not large, however, and does not seem to be gaining ground. The service is not highly remunerative,

¹⁹ "Report of Commissioner of Patents," *Statistical Abstract of the United States*, 1931, p. 878, and 1938, p. 805.

²⁰ *Air-Conditioning*, Occupational Information Monograph No. 4, University of the State of New York, March 1938, p. 8.

and remains one of the lesser white-collar occupations just below the professional level in requirements, remuneration, and operations.

Architects

The number of architects has increased from 2,017 in 1870 to 22,000 in 1930, which was .05 per cent of all gainful workers. They have gained more in numbers since the turn of the century than in the three decades prior to that time. This growth coincides with the rapid urbanization of the nation, the accumulation of economic surplus in the hands of wealthy persons who could afford to express their desire for architectural beauty in numerous homes, the extensive program of public building, the birth and flowering of the city-planning movement, and the development of functional architectural design in apartment houses and office buildings. Likewise, as large-scale building operations developed, new and more pliable materials and more economical methods of construction were introduced, architectural supervision was increasingly recognized as "good business." State laws were sought by the profession itself to prohibit building construction except under architectural supervision, to regulate standards of professional conduct, and to insure the erection of safe structures.

By 1931, 69 per cent of all buildings erected, as measured by their value, were built under the supervision and according to the plans of architects. Among residential structures, the percentage was 57, and among nonresidential it was 78 per cent.²¹ There is a fairly close agreement between the size and location of a structure and whether it will be built according to the plans of an architect. In cities builders have to comply with building-safety and sanitation laws and buildings of any size are almost universally constructed under the supervision of an architect. In the country, however, the reverse is true, and usually the nearest approach to professional supervision comes from a building contractor who has copied an architect's plans, or at rare intervals sought his advice.

The training of an architect in all of the more progressive states has been standardized at university graduation, one or more years of graduate work, a given amount of practical experience, and the satisfactory completion of a qualifying

²¹ Frederick P. Keppel, "The Arts in Social Life," *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 988.

examination usually conducted under state auspices. Despite these relatively high standards, which are, of course, comparatively recent, the number of architects is increasing and the ranks are being filled with young, ambitious graduates.

Admitting the scantiness of available facts, Clark and Associates estimated the average annual earnings of architects, based upon an assembly of data for the period 1920-36, to be \$3,820.²² The lowest fourth of employed architects earn less than \$2,000 a year; three-fourths of them earn less than \$3,990.

In 1938 a forecast in *Occupations* read as follows:

There is a fairly substantial agreement among observers that opportunities for the future are almost unlimited. The advantages and ultimate economies of correct design and planning are coming more and more to be appreciated. Current expansion in construction activity has stimulated demand for architectural services, and growing realization of need for adequate housing facilities is expected to result in a continuation of this demand. But it must never be forgotten that this demand will be for graduates possessed of high qualifications. In architecture, the incompetent are soon eliminated.²³

The working life of an architect is quite long, the physical demands are not heavy, and professional development increases with experience. Clark estimates the length of working life to be forty-three years, from approximately twenty-two to sixty-five years of age.

A substantial proportion of all architects are working as civil engineers in salaried positions. Others are engaged as consulting architects actually supervising the erection of structures. Still others combine their professional work with contracting and building businesses. A considerable degree of specialization is already evidenced in the profession. The city-planning movement brought into prominence the landscape architect, and the growth of large cities is responsible for the structural engineer-architect-designer. Some architects specialize in certain types of building, such as schoolhouses or hotel. Others engage in general practice with all types of structures.

The work is dependent upon general financial conditions and fluctuates decidedly with good and bad times. How seriously architects are affected by depression is indicated by the fact that in 1932 architects had less than one-seventh the work

²² Harold F. Clark and Associates, *Life Earnings in Selected Occupations in the United States*, Harper & Brothers, New York, 1937, p. 33.

²³ "The Architect," National Occupational Conference Abstract, *Occupations*, January 1938, p. 356.

under construction they had in 1928.²⁴ Assuming that architects were equally efficient in 1932, it appears that only one such person would be fully employed during the worst period of the depression as compared with seven in 1928.

Because of the heavy overhead costs of maintaining the large architectural-construction offices, such establishments did not fare as well as small offices during the depression. In fact, a noticeable trend was the increase in the number of independent architects during the depression years. Men who were released from their salaried positions undertook to establish themselves as both architects and practical builders. Because they could afford to work for the equivalent of artisan wages, they were able to secure an appreciable share of what business was to be found.²⁵

Photographers

The number of persons professionally engaged in photography in 1930 was 39,529. This was .08 per cent of all gainful workers and 1.4 per cent of all professional persons. Many photographers can hardly be classed as professional persons but would more properly be called skilled craftsmen. Yet in the field of portraiture and especially in the making of motion pictures the prolonged training and artistic quality of the work is of truly professional character.

The census does not segregate the kinds of photographers. The list includes picture and portrait takers in commercial shops, news photographers, camera men, retouchers, color photographers, aerial photographers, and so forth.²⁶ The trend toward specialization is growing, but the larger proportion of photographers are still in general photograph shops which specialize in portrait taking. The occupational trends show that there has been a slackening in rate of growth, especially since 1900. The fact that photographers have not increased in their proportion of the population must not be taken to signify a decreasing use of photographs and related products, such as

²⁴ Talbot Faulkner Hamlin, "The Architect and the Depression," *The Nation*, New York, August 9, 1933, p. 152.

²⁵ The NYA of Wisconsin has a leaflet on landscaping and the work of the landscape architect.

²⁶ The NYA publishes a leaflet on photography which distinguishes twelve types of photography: general commercial, portrait, news, aerial, motion-picture, clinical, X-ray, scientific, microscopic, research, pictorial or amateur, and magazine. *Vocational Analysis of Photography and Related Occupations*, NYA, Madison, Wisconsin, July 15, 1937.

the cinema. On the contrary, amateur photography has developed to such proportions that an enormous business is required to supply the apparatus and films used. But it would appear that amateur work suffices for many people, who no longer deem it necessary to have family portraits taken at fairly regular intervals by commercial photographers.

The trends in increase of all gainful workers and of photographers have remained about the same during the past sixty years; but in comparison with the trend in professional occupations Photographers has pursued an erratic course, having a proportionately smaller place in the Professional Service group in 1930 than at any time since 1870. Unfortunately the statistics are not detailed enough to permit an analysis of trends within the group known as Photographers. Expert opinion varies; but there is some reason to believe that the number of commercial photographers is not increasing as rapidly as the number of certain specialized workers in the field, such as cinema cameramen and newspaper and art photographers. It may well be that these fields are expanding and offer unusual opportunities, both in above-average remuneration and possibilities of employment.

In Table 259 certain important facts are offered concerning the more recent development of the photographic profession.

This table gives figures for establishments that devote their full attention to photographic work. It does not include the much larger number of industries in which some photographic work is done as an essential part of their activities. Approximately 90 per cent of the industries of the United States use photography in one form or another. The percentage of photographs used as advertisement illustrations has grown from 25 in 1920 to 47 in 1930. Many magazines are now devoted to visual appeals through photographs.

In the printing and publishing business, the camera has long been a practical aid, but of late years the invention of photographic processes makes possible an even wider use of photography in printing, so that some experts believe that the future course of the printing industry depends largely upon the perfection of photography. Radiography is finding an ever increasing field of operation in industry. In a number of manufacturing plants, X-ray photographs are made of castings to detect defects and flaws. The making of blueprints is a routine operation in industry. Few large plants can be found which

TABLE 259

PHOTOGRAPHIC BUSINESS IN THE UNITED STATES, 1933-1935*

	1933	1935
<i>Photographic apparatus and materials</i>		
Number of establishments.....	84	118
Percentage increase .....	...	40.5
Average number of wage earners.....	8,975	12,001
Percentage increase .....	...	36.8
<i>Photoengraving (not done in printing establishments)</i>		
Number of establishments.....	600	662
Percentage increase .....	...	10.3
Average number of wage earners.....	7,907	9,408
Percentage increase .....	...	19.0
<i>Photographic studios (personal service)</i>		
Number of establishments.....	8,330	10,402
Percentage increase .....	...	24.9
Average number of employees.....	7,826	11,792
Percentage increase .....	...	50.7
<i>Photo-finishing laboratories (commercial service)</i>		
Number of establishments.....	780	1,002
Percentage increase .....	...	28.4
Average number of employees.....	1,661	2,472
Percentage increase .....	...	48.8
<i>Blueprinting and photostat laboratories</i>		
Number of establishments.....	253	371
Percentage increase .....	...	46.6
Average number of employees.....	1,136	1,673
Percentage increase .....	...	47.2

* *Census of Manufactures, 1935*, pp. 595-1237; and "Services, Amusements and Hotels," *Census of American Business, 1935*, I, 1.

The first census of service establishments in the United States was taken in 1933: "Service Establishments," *Census of American Business, 1935*, I, 1.

do not have a photographic department for their own use. Commercial photography has become so well established that this work is an accepted part of advertising, and is being used increasingly by business firms and professional people.

In view of these facts it seems reasonable to expect the continued numerical expansion of photographic occupations. While the census figures indicate that the body of new workers added during the 1920-1930 decade has been about proportional to the increase to the total labor force, it is probable that this trend will continue for some time.

Authors, Editors, Reporters, Journalists, and Literary Persons

The number of professional writers engaged as authors, editors, and reporters totaled 64,293 in 1930, which was .13 per

cent of all gainful workers and 2.2 per cent of all professional persons. This group increased rapidly from 6,265 persons in 1870 to 40,035 in 1900, declined somewhat in 1910, recovered in the next census to approximately its 1900 position, then made its greatest decennial gain from 1920 to 1930. The census permits segregation into two groups, "Authors," and "Editors and Reporters," for the decades 1910-1930, as shown below:

	1910	1920	1930
Authors	4,368	6,668	12,449
Editors and Reporters.....	34,382	34,197	51,844
Total	38,750	40,865	64,293

From those figures it appears that the slight gain made between 1910 and 1920, which accounts for the recovery in the latter year to the point attained in 1900, is due to the increase in number of authors listed. The number of editors and reporters remained almost stationary during that period of time, in fact declined slightly from 1910 to 1920. The number of authors almost doubled in the 1920-1930 decade, while the number of editors and reporters increased 51 per cent.

These trends cannot be discussed intelligently until certain important events occurring in newspaper, periodical, and book publication have been analyzed. Table 260 gives the available pertinent data.

The largest number of daily newspapers was recorded in 1917, namely, 2,514.²⁷ Following that time the trend toward consolidation became marked, which resulted in a reduction to 1,932 daily newspapers in 1928. This loss does not, however, represent a smaller reading public, or fewer columns of newspaper copy reported, written, and printed. Both the size and the circulation of newspapers have grown during the period under review. Newspapers were published in 9,830 communities in 1931, but 80 per cent of them were small country weeklies. The number of morning papers declined from 427 in 1921 to 384 in 1931, evening papers from 1,601 in 1921 to 1,539 ten years later. The number of Sunday papers likewise dropped from 545 to 513 in the ten-year period.

The number of cities having a single daily newspaper rose

²⁷ Malcolm M. Willey and Stuart A. Rice, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 203-8, give an excellent brief summary of certain important developments in newspaper and periodical publication. Also, Horneil Hart, *Ibid.*, p. 382.

TABLE 260

NUMBER OF NEWSPAPERS, PERIODICALS, AND BOOKS BY AMERICAN AUTHORS;
CIRCULATION OF NEWSPAPERS AND PERIODICALS, 1900-1929*

	1900	1904	1909	1919	Change, 1929 over 1900
Total newspapers (daily) including foreign languages)		2,452	2,600	2,441	67
Percentage change		+10.1	+ 6.0	- 6.1	8.0
Circulation (in thousands)	15,102	19,633	24,212	42,948	27,846
Percentage increase		30.0	23.8	36.4	184.2
English-language dailies		2,325	2,463	2,237	2,166
Percentage change .....		....	+ 5.9	- 7.2	- 5.8
Circulation (in thousands)		18,417	30,313	40,622	22,205 ^b
Percentage increase .....		....	21.8	35.2	34.0
Foreign-language dailies		127	137	154	127
Percentage change .....		....	+ 7.8	+12.4	- 17.5
Circulation (in thousands)		1,216	1,786	2,710	2,325
Percentage change .....		....	+46.8	+51.7	- 14.2
Total Sunday (including foreign- language)		494	604	604	84 ^b
Percentage change .....		....	+ 5.3	+16.1	4.3
Circulation (in thousands)		12,022	13,347	19,369	29,012
Percentage increase			11.0	45.1	+
Total triweekly (including foreign- language)			73		64
Percentage change			+25.9	+27.4	- 31.2
Circulation (in thousands)		296,194	492,236	311,777	15,583 ^b
Percentage change .....		....	+13.2	+46.8	- 36.7
Total semiweekly		645	635	452	408
Percentage decrease			- 1.5	-23.8	- 9.7
Circulation (in thousands)			2,313	2,020	2,962
Percentage change			-21.2	-12.7	+ 47.6
Total weekly (including foreign- language)		15,006	15,097	12,145	7,075
Percentage change .....		....	+ 0.6	-19.5	- 41.7
Circulation (in thousands)		36,227	40,823	20,741	13,584
Percentage change			+12.7	-49.2	- 9.0
Aggregate circulation of all news- papers (in thousands)	15,102		24,212	42,948	27,846
Percentage increase		30.0	23.8	36.4	30.0
Newspaper products (all newspapers)					
Advertising value (in thousand dollars)	95,861	145,518	148,554	373,502	797,338
Percentage increase		51.8	2.1	151.3	113.3
Subscriptions and sales value (in thousand dollars)	79,923		84,439	192,820	275,781
Percentage increase			5.6 ^c		43.1

* This table was computed from the following sources: *Census of Manufactures*, 1933, p. 303; 1931, p. 534; 1929, Vol. II, p. 593; 1927, p. 617; 1925, p. 674; 1923, p. 609 ff.; 1921, p. 629; 1919, Vol. X, p. 581 ff.; 1914, Vol. II, p. 647 ff.; 1905, Part III, p. 799. Hornell Hart, "Changing Social Attitudes and Interests," *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1934, p. 389. "Directory of Newspapers and Magazines," *The Publishers' Weekly*, N. W. Ayer and Sons, January 26, 1901, p. 80; January 28, 1905, p. 171; January 29, 1910, p. 29; January 3, 1920, p. 14; January 25, 1930, p. 437.

^a No data, and not reported separately.

^b For 1929 over 1904.

^c For 1900 over 1909.

^d For 1929 over 1909.

^e For 1905.

^f For 1910.

^g For 1920.

^h Estimated.

PROFESSIONAL SERVICE

TABLE 260 (Concluded)

	1900	1904	1909	1919	1929	Change, 1929 over 1900
Periodical products (all periodicals)						
Advertising value (in thousand dollars)			53,979	154,797	322,900	268,921 ^d
Percentage increase				187.0	106.6	498.2 ^d
Subscriptions and sales value (in thousand dollars)				85,187	184,545	+ 133,921 ^d
Percentage increase				68.2	116.8	+ 264.7 ^d
Total number periodicals			3,216	4,754	4,915	+ 1,722 ^b
Percentage increase			0.7	47.8	8.4	+ 53.8 ^b
Total circulation of periodicals (in thousands)	109,197	140,377	140,251	189,453	250,085	+ 140,888
Percentage change		+28.5	— .03	+35.0	+ 52.0	+ 129.0
Number of different "titles" of American authors published ...	3,878	5,978	8,308	458		
Percentage change		+54.1	+39.0	—94.5	+1,485.0	+ 87.2
Number <i>Belle Lettres</i> by American authors	1,643	2,579	2,827	109	3,437	+ 1,794
Percentage change		+56.9	+ 9.6	—96.1	+3,052.0	+ 109.1
Number applied, scientific, etc., by American authors	2,235	3,399	5,481	349		+ 1,588
Percentage change		+52.0	+61.3	—98.6	+ 995.1	+ 71.2
News and opinion periodicals	1,925	3,119 ^e	4,176 ^f	6,951 ^g	9,964	+ 8,039
Percentage increase			33.9 ^f	66.4 ^g	43.3	+ 417.5
Business and industrial periodicals..		454 ^e	585 ^f	887 ^g	1,278 ^h	+ 1,016
Percentage increase		73.2 ^e	23.8 ^f	51.7 ^g	44.1	+ 383.0
All other periodicals	3,384	6,664 ^e	10,697 ^f	14,717 ^g	21,397	+ 18,013
Percentage increase		97.0 ^e	60.4 ^f	37.6 ^g	45.3	+ 532.2

from 353 in 1900 to 686 in 1920 and to 913 in 1930. Such an increase is the result of suspensions and consolidations caused by the development of the newspaper as a business rather than as a medium for the expression of opinion and the dissemination of news—this being a business which lends itself to chain operations on a large scale. Objective evidences of these circumstances are not lacking. For example, in 1909, 64 per cent of newspaper income came from advertising, 36 per cent from subscriptions and sales. By 1927 the amount of revenue received from advertising had grown to 74 per cent, while subscription and sales returns had dropped to 26 per cent. Finding it "bad for business" and unprofitable to profess a definite political opinion and to carry a particular political party label, "Democratic" newspapers declined 39 per cent in number from 1900 to 1930, and "Republican" newspapers declined 37 per cent in the same period of time. So-called "independent" papers, that is, papers having no avowed political character, increased in that span of time by 99 per cent.

Modern methods of printing and rapid means of communication have added their share to the unification of newspapers. It is now possible to make house-to-house delivery of metropolitan dailies to far-distant communities, so prepared as to offer local "sheets" covering the news and events of interest primarily to those communities. Even when this method does not suffice to eliminate the small local paper, that paper is increasingly dependent upon the "boiler plate" sent from central news agencies located in metropolitan cities and syndicated throughout the country. This syndication of news, reviews, and comment has given rise to the journalist of high reputation and has provided readers in even backwoods localities with the best reporting and news comment available to the great dailies and their subscribers. It is probable that the effect has been to save the existence of small newspapers which otherwise would have succumbed to the competition of the regional metropolitan newspaper and that as a result reporting and editorial jobs were saved for many workers.

Increasingly the editor or reporter engaged in daily-newspaper work will find himself employed in a newspaper chain working for a single corporation. The official journal of the trade, *Editor and Publisher*, noted this trend as early as 1928, even suggesting that it was assuming the proportions of a journalistic monopoly in each town and city.²⁸ While this trend toward monopoly continues, it is passing beyond the confines of each community, with newspapers being linked together in one or another of the great chains. The Scripps-Howard chain operated 26 newspapers and maintained its own international news-gathering agency in 1932. The Hearst chain had 29 newspapers and its own international news service. There are some 20 other chains in the country.²⁹

Probably one of the principal reasons for the unusual increase in the number of editors and reporters, despite the greater consolidation of newspapers, is the growth of the news-gathering agencies. With accentuated demand for world-wide coverage on the part of world-minded readers, and with world events brought right inside our homes by the radio, the press has been forced to meet the issue by establishing press services on an international basis. The Associated Press, owned by

²⁸ Reported by Harry Laidler, *Concentration in American Industry*, Thomas Y. Crowell Company, New York, 1931, p. 265.

²⁹ J. G. Glover and W. B. Cornell, *The Development of American Industries*, Prentice-Hall, Inc., New York, 1932, p. 147.

member newspapers, was originally formed in 1848 and was reorganized in 1900. At a cost of approximately ten million dollars, in 1929, a force of 3,300 reporters, editors, and dispatchers collected, wrote, and sent stories to 1,250 newspapers, scattered throughout the United States.

Another reason for the rapid increase in number of editors and reporters noted during the past decade is the specialization which has developed in the newspaper industry. As papers became fewer they likewise became larger, with well-developed departments catering to particular readers. The number of different kinds of editors increased, and the work of specialists was featured to attract and hold interest. The Sunday supplement, the magazine, the radio, and the sports section are either new or greatly enlarged. While general newsgatherers are still required, there is a growing inclination to dispense with more of their service and to use "feature stuff" and "boiler plate."

In view of these several trends, some of them seemingly working toward the reduction in number of editors and reporters, others requiring more such people, it is difficult to reach a conclusion concerning the immediate future of these professional persons. However, the writers are of the opinion, in view of all available data, that there will be a tendency toward increased concentration of newspaper publishing, fewer and probably larger newspapers being published under relatively fewer owners, a greater specialization of editorial and reporter service, a larger use of syndicated and feature writers, a considerable development in quantity and quality of news comment both in the press and over the air, a further specialization of trade journals and an increase in their number, an additional use of reporters and editors in publicity departments of industry and in advertising agencies, and a continued growth in periodical and book reading as the general public becomes better schooled and develops discrimination in reading.³⁰ These trends suggest an increasing demand for authors, editors, and reporters. That generally depressed business conditions will, from time to time, force editors and reporters into the ranks of the unemployed is to be expected.

Harold Clark estimates the average salary of experienced

³⁰ Hornell Hart, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, pp. 388-89, says: "A six-fold increase in periodical circulation from 1900 to 1930 corresponds approximately with the rate of increase in the numbers of high school and college students in the United States."

reporters on small newspapers, those with less than 40,000 circulation, to be \$1,800 a year for the period 1920 to 1936. Editors of such newspapers received an average salary of \$3,000 a year. The average salary of experienced reporters on large papers, those with circulations in excess of 40,000, was \$3,000; while editors on these metropolitan dailies average \$7,000 a year. The average annual income of all newspaper workers, based upon the period 1920-1936, is \$2,120.⁸¹

Clergymen

Clergymen numbered 148,848 in 1930, were .12 per cent of the population, .30 per cent of all gainful workers, and 5.1 per cent of all professional persons. This is a great change from conditions in the Colonial days when clergymen, lawyers, and doctors were almost the only professional people and clergymen led all of them in point of numbers. However, the number of clergymen recorded in the census of 1930 was greater than at any period in the previous sixty years. The numerical increase of this group has slackened; from 1870 to 1900, there were 67,764 clergymen added to the roster, while from 1900 to 1930 only 37,210 new clergymen were listed. There was one clergymen for every 879 inhabitants in 1870; in 1900 there was one clergyman for 680 persons; but by 1930 there was only one clergyman for every 824 persons in the population.

In relation to the growth of the total population, the number of clergymen increased from 1870 until 1900, declined until 1920, and remained stationary in the decade 1920-1930. There was a further decline in their number of 2,631 by 1934. In comparison with the growth of the total of gainful workers, the number of clergymen increased from 1870 to 1890, and has not maintained its relative position since then, declining somewhat in every decade until in 1930, when they were a smaller proportion of the national labor force than at any previous census in the past sixty years. From 13 per cent of all professional workers in 1870, the proportion of clergymen declined steadily until it was only 5 per cent in 1930.

Unfortunately, comparable figures are not available which permit comparisons between the number of clergymen and other important data revealing the trends in church activities.

⁸¹ Harold Clark and Associates, *Life Earnings in Selected Occupations in the United States*, Harper Brothers, New York, 1937, pp. 56-57.

From those which could be collected, the following display³² has been made:

	1916	1926	Percent- age In- crease 1926 over 1916
Denominations in the United States	200	212	6.0
Number of local churches	226,718	232,154	2.4
Reported church membership	41,926,854	54,576,346	30.1
Value of churches (in thousand dollars)	1,676,000	3,839,500	129.0
Total church expenditures (in thousand dol- lars)	328,809	817,214	148.5
Number of clergymen (nearest census year) 1920-1930	127,270	148,848	16.9

From 1916 to 1926 the number of churches increased slightly, while both membership and value of church property grew appreciably. The average rural church in 1926 had 115 members, who contributed \$1,400 annually. The average city church had 546 members, who conducted a work requiring the average annual expenditure of \$10,011.

The maximum salary reported for the average clergyman was \$2,136 in 1929, and there was a steady decline thereafter until in 1934 the average salary was \$1,578.³³ Additional labor income of clergymen averaged \$66 per year in 1929 and \$70 in 1934. However, these figures depict only average conditions in the profession. Many clergymen still receive other forms of income, such as rent, food, and clothing, which does not appear as salary or compensation for labor.

Judging by the occupational trends, the financial conditions of existing churches, the growing number of churches compelled to go without ministers, the decline in active church participation, and the rapid expansion of social-service enterprises which offer attractions to persons who might otherwise become clergymen, it seems probable that the number of clergymen is approaching a maximum, if it has not already reached that point. In proportion to the total population and

³² *Census of Religious Bodies, 1926*, Bureau of the Census, I, 13-80; and *Fifteenth Census of the United States, 1930*, "Population," V, 47.

The *Census of Religious Bodies* for 1936 released by the Census Bureau, August 1940, shows: Denominations, 256; church organizations, 199,302; members, 55,807,366; total expenditures, \$518,953,571; value of churches, \$3,411,000,000. The decline in number of church organizations to be served by clergymen was 14.1 per cent from 1926 to 1936.

³³ *National Income in the United States, 1929-35*, United States Department of Commerce, p. 211.

the total of gainful workers, it is almost certain that clergymen will continue to lose ground, becoming a relatively smaller part of each group.

Lawyers, Judges, and Justices

A time-honored profession is that of the law. It is represented in the census by three related groups: Lawyers, Judges, and Justices. As professional workers, all are legally trained and are engaged in interpretation, prosecution, and defense under the law. These groups contained 160,605 persons in 1930, which was .13 per cent of all inhabitants in the United States, .33 per cent of all gainful workers, and 5.5 per cent of all professional persons.

There was one member of the legal fraternity for every 946 persons in the country in 1870 and one for every 664 persons in 1900; but by 1930 the number had receded to one for 764. This is a very crude measure of the importance in American life of the judge and the lawyer. It is an unsatisfactory measure because the need for legal service is not determined so much by the size of the population as by its character and activities.

The practice of law is built up out of difficulties, both premeditated and casual, of individuals in their personal and business relationships. As social and economic life becomes more complex, the need for professional advice and assistance with the law becomes greater. Law has become an adjunct of business. The increase in the number of lawyers coincides with the development of modern industry and its needs for legal advice and defense. Business taxation was not extensive before the Civil War; the corporation tax, income taxes, capital gains and other forms of business taxation, which are involved and require skilled legal care, have developed more particularly since 1900. The automobile has added accident and damage suits which were undreamed of by lawyers in the last century. As modes of life have changed, with domestic friction increasing, the services of the law have been called upon more often. The formation of business corporations and the conduct of stockholders' and other business meetings have created more need for lawyers. Offsetting these developments have been losses such as the removal of the search and clearance of land titles from individual lawyers to title insurance companies.

Lawyers, perhaps more than most professional groups, are

in demand in both "booms" and "depressions." The number of persons engaged in rendering legal service in 1929 totaled 196,737; but this number had increased from the height of prosperity to the depth of depression in 1933 to 237,073, an increase of 21 per cent in four years.³⁴ Lawyers alone increased from 102,211 in 1929 to 122,908 in 1933. While other aspects of our economy contract spasmodically under the pressure of depression, failing businesses and the feverish attempts of people to salvage some of their possessions make greater demands upon the services of the legal profession.

The increase in number of persons engaged in the practice of the law has been rapid during the sixty years preceding 1930. The gain from 1870 to 1900 was 73,724 and that from 1900 to 1930 only 46,145, indicating a decline in the number of new recruits in the later decades. But the trend has not been steady, and the greatest numerical decennial gain yet recorded was from 1920 to 1930, when, despite the much higher standards of entrance to the profession and the widely disseminated information concerning low earnings and diminishing opportunities, a total of 38,086 new lawyers were admitted to practice, a gain of 31 per cent in the ten-year period. Nor does this gain represent lawyers who entered the employ of law or business firms or civil service. The number of new lawyers entering private practice from 1930 to 1934 was 18,997,³⁵ a gain of 17 per cent in the four years; the number employed as lawyers in the employ of other lawyers increased 1,410, or 5 per cent in that time.

The per capita income of lawyers in the United States in 1930 was \$5,194; by 1934 it had shrunk to \$4,218.³⁶ Obviously this is a very rough measure of income, for it strikes an average between the very substantial number of lawyers who earn less than a decent living and the relatively few lawyers whose income exceeds \$50,000 a year. Lawyers employed regularly as full-time salaried workers had a per capita income of \$2,268 in 1930, but their income dropped to \$1,803 in 1934. The per capita income of lawyers in private practice in 1934 had declined 24 per cent from the maximum in 1929, and that of employed lawyers had dropped 18 per cent. Thus, within the profession itself is a wide range of competencies and a very

³⁴ *National Income in the United States, 1929-35*, United States Department of Commerce, p. 214.

³⁵ *Ibid.*

³⁶ *Ibid.*, p. 215.

wide range of income, so that no one figure can adequately describe the material circumstances of lawyers.

Another difficulty in determining the incomes of lawyers is the fact that these earnings fluctuate from year to year in the professional careers of lawyers, depending upon the amount and character of practice followed. Also, new entrants to the profession must go through a long period of apprenticeship and legal drudgery before establishing a paying practice. The *Weekly News Review*,⁸⁷ quoting figures gleaned from studies of the American Bar Association, indicates that the average net income of lawyers during the first four years of practice does not exceed \$38 a week; from the fifth to the ninth year, earnings average \$51 a week; and only after fifteen years of steady practice can the fortunate survivors of this rigorous regime of training and experience expect to approach an income of \$100 a week.

Average conditions do not have to be relied upon, however, for certain surveys depict actual conditions within the profession. In a survey of all lawyers in New York in 1935 it was found that a third were unable to make \$20 a week and 10 per cent were virtually confessed paupers. A survey conducted throughout California showed that three years after graduation from law school and admission to the bar a third of all lawyers were unable to make enough money for their own support.

Despite these difficult conditions, an increasing number of young persons are directing their attention to the law, undergoing the long and costly training, which now involves from two to six years of college and university schooling, and accepting in exchange for many years of their professional life remuneration which is not above the level of skilled workmen.

Increasingly lawyers are finding their way into business itself and into the public service; but the majority of new entrants still make their way in private practice. Here, however, a marked change has occurred. In a brilliant résumé,⁸⁸ Berle points out that the law has lost much of its professional character and ethics, which have been sacrificed to business practices and profit-making.

The practice of law has been transformed. At the top is the great law corporation with thirty to forty partners and as many

⁸⁷ *Weekly News Review*, December 13, 1937, Washington, D.C., p. 4.

⁸⁸ A. A. Berle, Jr., "Modern Legal Profession," *Encyclopaedia of the Social Sciences*, The Macmillan Company, New York, 1933, V, 340-44.

as two hundred associated attorneys working for them. The enormous output of new lawyers graduated yearly from law schools furnishes these corporation law offices with an abundance of cheap assistants, who are required to perform those details of legal practice which are on the level of higher clerical work and thus free the law partners to conduct a much-increased volume of business. The next level of law practice is that conducted in the smaller firms having a membership of from three to twenty, who do a considerable amount of pleading and are not engaged as business solicitors as much as the corporation-law firms. Below these two levels are the vast majority of lawyers practicing alone or in partnerships, handling individual and private business, doing much of the clerical work and all of the professional work themselves.

Probably the greatest single appeal of the legal profession and the one which prompts middle-class youth to assume all the risks, to secure the necessary training, and to launch themselves in the practice of law is the fact that it is one of the relatively few professions, or high-level occupations, in which a trained person can engage without much capital beyond the costs of his education, office rent and equipment, and the sum necessary to provide food and clothing. As Professor Berle remarks, "The position of the lawyer has an even greater appeal than before. It remains one of the few careers through which a man can attain great wealth without having capital at the start, and the fortunes accumulated by a few men at the bar are taken as an index of its normal possibilities."³⁹ Thus the law continues to have a great occupational appeal to aspiring young men. Even those leaders who conduct law schools are at a loss as to what should be advised, and in their dilemma are inclined to remark, as does Dean Kirkwood of the Stanford University Law School: "There are undoubtedly too many poor lawyers, but certainly the country can use more good ones."⁴⁰ Unfortunately there are no precise or even fairly adequate prognostic measures of who will make good or bad lawyers, and the requirements for professional training and admission to practice are such as to fail to discriminate in any refined way between the two. The result is that the legal pro-

³⁹ A. A. Berle, Jr., "Modern Legal Profession," *Encyclopaedia of the Social Sciences*, The Macmillan Company, New York, 1933, V, 341.

⁴⁰ Robert E. Swain, "Chemistry and Physics," in *University Training and Vocational Outlets*, edited by C. Gilbert Wrenn, Stanford University, 1935, p. 52.

fession continues to grow rapidly, filled by aspiring young people to whom the law seems to offer a chance to secure professional status.

In all this discussion of lawyers little regard has been paid to the function of the law in terms of satisfying social needs. If social policy should alter to the extent that legal advice, counsel, and defense would be furnished under public auspices, as already through the introduction of the public defender, then it is probable that a much wider use of legal services would follow. Many persons would be greatly aided by access to legal counsel for whom lawyers' fees and the private character of the law business are at present forbidding. The extension of civil services which include legal advice, such as is increasingly found in the rapidly expanding agencies of government, point in this direction.⁴¹

If private lawyers should develop a means of placing their services before the average body of citizens, then it is conceivable that the present number of lawyers would not prove excessive and that the new recruits being added in such numbers would find work to do. For this, obviously, fabulous fees and large earnings of lawyers would have to be sacrificed; and it is quite probable that the average income of lawyers, while becoming steadier and more assured, would be considerably less than the present \$4,200 national average (or \$3,600 median) income reported by Harold Clark. Even so, the average income would still set its recipient off as one having a preferred income status in comparison with the general worker in the total population.

Judged by the occupational trends of lawyers and the developments in our economy which use legal services, it is probable that the present chaotic conditions will continue for some time to come, with more lawyers entering the ranks yearly, and a maladjustment prevailing in work and incomes. It is a situation fraught with serious social consequences in which a sub-

⁴¹Isidor Lazarus, in "What Are the Prospects in the Legal Profession?" *Occupations*, June 1937, p. 845, states:

"The average lawyer of the future will perhaps find sufficient support and satisfaction in serving group forces in society such as labor, the unemployed, or the middle classes, since the larger business enterprises seem to have all the legal talent they need. More and more lawyers from now on will have to rely upon their own clients, as the demand by existing lawyers for well-paid assistants is practically nil and is not likely to increase.

"Practicing law is terrific drudgery, relieved only by a great devotion to the profession. The larger financial rewards generally go to the lucky or exceptional lawyers, to the well-born or well connected, to the geniuses, and to extraordinary public servants. Many ordinary lawyers and some good ones are starving."

stantial proportion of the profession cannot honestly earn a living, while a relatively small group among them are greatly overworked and obtain an enormous income.

Physicians and Surgeons

This old and established profession had 159,920 members in 1930, who were .13 per cent of the population, .33 per cent of all gainful workers, and 5.5 per cent of all professional persons. Their numerical growth has slackened perceptibly. In the thirty years from 1870 to 1900 a total of 69,554 physicians and surgeons were added but in the thirty years, from 1900 to 1930, only 27,918. There was one doctor of medicine for every 617 persons in the country in 1870, one for 575 in 1900, and one for every 768 in 1930. These figures are crude measures of the adequacy of medical service, however. They indicate very little with respect to the over- or undersupply of medical persons. For example, it may be that there are fewer or more sick persons than formerly, or that the organization and distribution of medical care is such that fewer or more doctors are needed. None of these things are sufficiently well known to make very significant such a measure as the gross figure of number of physicians per unit of population.

Data are available since 1920 for the two groups which comprise physicians and surgeons, namely, persons holding the degree of Doctor of Medicine and of Doctor of Osteopathy. The number of doctors of osteopathy is relatively small—5,030 in 1920 and 6,117 in 1930, being less than 4 per cent of the Physicians and Surgeons group. Consequently, the trend for physicians and surgeons will be determined by doctors of medicine.

The number of doctors of medicine declined from 151,132 in 1910 to 144,977 in 1920, a decrease of 4 per cent, and then regained the loss and emerged in 1930 with 2,771 more practitioners recorded than in the peak year of 1910. However, despite the growing emphasis on both preventive and curative medicine, the increasing volume of medical service, the more detailed and accurate treatment of disease by both private physicians and public-health personnel, the multiplication of the number of diagnostic laboratories, the marked specialization within the field of medicine itself, the social-economic factors of a concentration of population, extension of education,

and the rise in incomes received by individuals—all of which tend toward the use of a much larger medical personnel—the number of doctors increased only 21 per cent in the decade preceding 1930, during a period of time in which medical practice grew rapidly in both total volume and diversity. In fact, the greatest advances in medical science, as the doctor applies that science, have probably occurred since 1910, whereas the medically trained practitioners increased only 5.8 per cent between 1910 and 1930.

These conditions are accounted for by the interplay of several factors. The "fly-by-night" medical schools and "diploma mills," which gave short courses and high-sounding degrees to poorly prepared persons, have been virtually eliminated because of the efforts of the professional organizations and the growing enlightenment of the people. With reputable medical schools as training centers, the prolonged and costly course, from seven to ten years beyond the high school, has served as a most effective barrier to entrance into the medical profession. The tuition and laboratory costs of the strictly professional medical course is not less than \$1,500. The applicants average 12,000 a year, approximately half that number being accepted. The cost of equipping these medical-training centers has been advanced as the major reason why such strict limits are placed on the number of students accepted for training.

This is a social problem which public policy must settle. If society regards private medical services as too costly for the average purse and still wishes to maintain this service on a private profit-making basis, then its only recourse will be to provide enough training facilities to permit many of those who are qualified and desirous of entering the medical profession to secure the necessary training.

However, charges for medical services do not follow supply-and-demand factors in the same way that these factors regulate competitive business prices, because medicine is a monopoly governed by the business practices and standards of the professional organizations which control physicians. Medical fees are maintained at a rather remarkably constant level in both good and bad times. While bills owed to doctors go unpaid, and the free practice of physicians increases, the fee schedule does not respond to depression as do the prices of commodities on the market. Only a very substantial increase in the number of qualified physicians would tend to give more pa-

tients the benefit of lowered prices in keeping with their ability to pay for medical services.

Increase in the number of physicians is retarded by the high cost of entering private practice and the long waiting period before a paying practice is established. The Committee on the Cost of Medical Care⁴² estimated that new entrants into the profession invest from \$1,860 to \$3,310 for office equipment and instruments upon opening their offices. Even among graduate physicians from the upper middle class, this initial outlay is frequently a heavy burden. That it forms a barrier for many who would otherwise undertake medical training is obvious.

A noticeable trend in recent years is in the direction of employed or group practice. The effect of this upon new entrants into the profession is marked. Approximately 15 per cent of all physicians are employed full time by business firms or agencies. Their number has increased as each successive class of medical graduates is added to the corps of practicing physicians. Of all graduates entering practice in 1920, 17 per cent were found engaged in their profession as employed persons when surveyed in 1929. Of all physicians and surgeons reported by the census in 1930, the percentage working for pay rather than in private practice was 27.⁴³

The number and distribution of physicians available for service have not been planned with a view to meeting the health needs of the entire population. Medical practice, as a private venture, has always assumed that the care of wholly indigent persons is the responsibility of the state and that provision for medical services for other members of society is strictly a matter for contractual relationships between private physicians and private citizens. In such a situation, it is inevitable that a very large percentage of the people will have insufficient and inadequate medical care, that certain socially minded doctors will be overburdened with free patients, that the practice of medicine will become for many doctors strictly a business venture in which their technical skill is sold to high bidders only, and that many quite competent practitioners who are poor business promoters will eke out meager incomes and

⁴² *Encyclopaedia of the Social Sciences*, Section on Economic Organization by Lewis Webster Jones and Barbara Jones, The Macmillan Company, New York, 1937, X, 292-99.

⁴³ Allon Peebles, *A Survey of Statistical Data on Medical Facilities in the United States*, The Committee on the Cost of Medical Care, Publication No. 3, Washington, D.C., 1929, pp. 28-29, 75; also *National Income in the United States, 1929-35*, United States Department of Commerce, p. 213.

render society only a small part of that professional service of which they are capable.

All surveys so far conducted reveal a high measure of agreement between adequacy of medical care and income status. For example, a state-wide California study, conducted in 1933, showed that nine out of ten disabling illnesses receive medical attention when occurring in families having incomes in excess of \$3,000 annually; only seven out of ten such illnesses among low-incomed families received medical care in that enlightened and wealthy state, where medical facilities, both public and private, and number of doctors per capita greatly exceed those of most other states in the Union.⁴⁴

When it is remembered that 21 per cent of all families in the United States had an income of less than \$1,000 a year at the very peak of prosperity in 1929,⁴⁵ and when the high correlation between lack of medical care, the need for it, and low income status are considered, the conclusion is obvious that a very substantial portion of our national population require medical care which, under the existing organization of such facilities and the existing distribution of medical officers, is denied them.

The average net income from the private practice of medicine by physicians and surgeons at the peak of prosperity in 1929 was \$5,403.⁴⁶ This income dropped to \$5,119 the next year, declined to the low point of \$3,088 in the depth of the depression in 1933, and climbed back to \$3,570 in 1934. That the income circumstances and volume of practice of doctors depends upon economic conditions rather than the needs of the people is proved by the fact that physicians' incomes declined 42 per cent in the four years from 1929 to 1933, while the population and the number of people requiring medical services were increasing.

The American Medical Association reports that currently over 90 per cent of all practicing physicians and surgeons earn

⁴⁴ The interested reader is directed to the Committee on the Cost of Medical Care study; The Medical Survey of the Joint Committee of the California State Department of Health and the California Medical Association, made under the technical direction of Dr. Paul A. Dodd; and the study by Margaret Klem, *Medical Costs; and Costs in California Families in Relation to Economic Status*, State Relief Administration, California, 1935. The figures quoted in this text are from the last-named reference, p. 19.

⁴⁵ Maurice Leven et al., *America's Capacity to Consume*, Brookings Institution, Washington, D.C., 1934, p. 228.

⁴⁶ *National Income in the United States, 1929-35*, United States Department of Commerce, p. 214.

over \$2,000 net annually, two-thirds earn more than \$5,200, and one-seventh earn in excess of \$10,000 a year.⁴⁷

A more detailed assembly of information on doctors' incomes made in the excellent and thorough "Dodd Report" for the quite favored state of California showed the following conditions⁴⁸ prevailing during 1933:

Net Professional Income, 1933			
	All Physicians	General Practitioners	Complete Specialists
Number of cases.....	2,737	1,132	935
Mean income	\$3,572	\$2,869	\$4,364
Median income	2,700	2,200	3,500

Percentage of Physicians			
	All Physicians	General Practitioners	Complete Specialists
Experiencing net loss for year	1.8	1.9	1.4
Below \$1,000	13.5	18.3	9.3
\$1,000 to \$1,999	18.4	21.9	14.4
\$2,000 to \$2,999	20.4	22.3	17.0
\$3,000 to \$5,000	23.2	21.2	27.5
\$5,000 to \$10,000	16.5	11.3	21.6
Over \$10,000	5.6	3.1	8.8

Of all gainfully employed, exclusive of farmers, in 1929, at the peak of prosperity, 44 per cent earned less than \$1,000 income, only 3.2 per cent earned between \$3,000 and \$5,000, and only 2.4 per cent received more than \$5,000.⁴⁹

It is at once apparent from a comparison of medical incomes with that of all gainful workers that medical men are in a most advantageous position. The average physician earns approximately three times as much as the average gainful worker. Even in comparison with most other professional persons, physicians receive higher incomes. Two-thirds of all practicing physicians in California, and probably well over half of all medical practitioners in the United States, have a preferred income status which enables them to enjoy a luxury standard of living.

It is quite possible that the present number of physicians could be used more effectively and that they could be kept

⁴⁷ Reports of the American Medical Association, quoted in *Weekly News Review*, January 31, 1938, p. 7.

⁴⁸ "Economic Aspects of the Practice of Medicine in California: A Report of the Committee of Five, for the Study of Medical Care of the California Medical Association," Paul A. Dodd, Director of the Survey, manuscript copy, 1935, p. 234.

⁴⁹ Maurice Leven et al., *America's Capacity to Consume*, Brookings Institution, Washington, D.C., 1934, p. 219.

much busier meeting the health needs of a larger proportion of the population if some means could be provided to pay the fees of those requiring medical attention.

If the present private practice of medicine is continued, the only, though probably remote, prospect for adequate care to be provided at costs within the means of the average purse is a greatly increased training program, graduating a much enlarged body of professional physicians and surgeons, with some government regulation of fees. Yet, while the graduates of training centers are increasing in number, the total gain in number of doctors reported by the American Medical Association in 1936, as compared with 1930, was 5,243. If the same rate of growth prevails for the next four years of the decade, the decennial increase will be slightly less than the increase recorded from 1920 to 1930, indicating that no such addition to the number of practicing physicians is taking place as would be required either to supply the field adequately or to bring professional fees down to a price that the people requiring regular medical attention and advice could afford to pay. The possibility of breaking the monopoly of medical associations in arriving at a noncompetitive fee schedule is apparently very slight, and only if this is done can the greatest benefits to the patients be secured.

With the profession of medicine continued as a private, profit-making business, its advantages for the average and above-average physician and surgeon are so pronounced that its attractiveness should appeal to many prospective workers. If the training facilities are provided, and some means of defraying educational costs and initial professional outlay can be budgeted, then the field of medicine should experience a very considerable increase in the number of practicing physicians and surgeons.

If social policy alters sufficiently to establish group-payment plans and to extend the insurance principle to the field of medical care, then the need for more physicians will be even more pronounced, especially if adequate or complete coverage and compulsory participation are provided. Such an approach has been found in modern European countries, where health-insurance plans have been in operation for many years. The growing insistence on the part of the people for some such solution to their health problems has resulted in legislation being submitted in several state legislatures; and only recently the

controlling professional organization, the American Medical Association, has admitted the necessity of a more social administration of medical practice.

Although socialized medicine is in its initial stages, and it is impossible to predict the direction it will take, the probabilities are that some form of public control of medicine will result. When it does, a very substantial increase will follow in the number of medical men needed. For under some such arrangement it will be possible to plan for the approximate number of physicians required to promote the health of the nation.

Dentists

Dentists numbered 71,055 in 1930, and were .05 per cent of the total population, .15 per cent of all gainful workers, and 2.4 per cent of professional persons. During the thirty years from 1870 to 1900 they increased 21,826; during the thirty years from 1900 to 1930 they increased 41,390. In comparison with the numerical growth of the total gainful workers, the number of dentists increased more rapidly from 1870 to 1900, remained stationary to 1910, and increased in the succeeding decade. With respect to the Professional Service group of occupations, although dentists have been growing numerically, as has just been indicated, other occupations have increased more rapidly; hence dentists have not become a much larger proportion of professional workers during any census of the sixty years under review.

Dentistry is a relatively new profession, one which has not reached its limit either in technical accomplishment or in supplying the needs of the population. Until the middle of the nineteenth century dentistry was a craft, and proficiency in it was acquired solely by apprenticeship. When, in 1839, medical authorities were requested to assume responsibility for training dentists, the faculty of the most important medical school replied that dentistry was not important enough to be included in the curriculum.⁵⁰ The development of dentistry as a profession was so slow that even in 1865 there were only four professional schools, whose graduates that year totaled 61. By 1868 the legislatures of three states had legalized the practice of dentistry and by 1900 all other states had passed laws restrict-

⁵⁰ Lewis W. Jones, "Dentistry," *Encyclopaedia of the Social Sciences*, The Macmillan Company, New York, 1933, V, 91-93—an excellent short account of dentistry.

ing the practice of dentistry to professionally qualified persons. In 1926 there were 44 dental training schools of professional character in the United States.

Dentistry is now becoming specialized. In Philadelphia, for example, 86 per cent of all dentists are general practitioners, 11 per cent are partial specialists, and 3 per cent devote their entire time to such specialties as surgery or orthodontia. Although such specialization is increasing, it is restricted as yet to the larger centers of population.

The attention devoted to oral hygiene has given rise to certain affiliated occupations. Dental technicians are employed in laboratories preparing appliances, such as bridges, plates, crowns, and inlays. In this comparatively new field of work, it is estimated that fully 10,000 persons are now engaged.⁵¹ The trend is rapidly upward, with the number of dental technicians increasing somewhat in proportion to the growth in number of dentists upon whom they depend for work.

Dental hygienists appeared in 1914, and their number rapidly increased until there are now over 23,000 engaged in preventive care of teeth in public schools, clinics, and other institutions. Practically all dental hygienists are women, and their service requires training of professional character.

In 1870 there was one dentist for every 4,918 persons in the country; by 1930 there was one dentist for 1,728 persons. But there is no even distribution of dentists; for they, like doctors and lawyers, tend to congregate in the metropolitan areas. In some cities, there is one dentist for every 500 persons; in others, to every 4,000. California has one dentist for every 970 inhabitants; Mississippi, one for every 5,263 persons.⁵² Even in cities of 30,000 population scattered throughout the country the number of dentists averages 10 per 10,000 population, with the range from 3.9 to 15.7 dentists serving the same number of people.

That dentistry has not been applied to all who need either preventive or remedial care is indicated by the fact that only 38 per cent of the people receive any dental aid. Every study of the problem points to the reason stated by Lewis Jones that,

⁵¹ Estimate of Dental Laboratory Association of Chicago, quoted by Lewis W. Jones, "Dentistry," *Encyclopædia of the Social Sciences*, The Macmillan Company, New York, 1935 (reprinted 1937), III, 92.

⁵² Allon Peebles, *A Survey of Statistical Data on Medical Facilities in the United States*, The Committee on the Cost of Medical Care, Publication No. 3, Washington, D.C., 1929, pp. 29-30.

"This neglect appears to be due not to lack of intelligence but to lack of money."⁵³ He reports a study by Michael M. Davis which showed that in a well-selected sample of 1,226 working-class families, three-fourths had \$1,200 income a year and spent nothing on dentistry; of families having \$2,500 a year income, the reverse was true, with only one-fourth being without dental care.

The fact that such a large proportion of the population are without dental care is not due to the avarice of dentists, however, but rather to the cost of dental equipment, materials, and overhead and to the fact that dental service has not been rationally planned so as to use the time of dentists economically. The net incomes of dentists in the wealthy state of California,⁵⁴ as reported in the state-wide Dodd study, are as follows:

Practitioners	Net Income	
	1929	1934
All dentists	\$5,095	\$2,936
General practitioners	4,770	2,847
Partial practitioners	6,944	3,408
Complete specialists	8,731	4,435

The Committee on the Cost of Medical Care ascertained that the average annual net earnings of 205 Philadelphia dentists in 1928 was \$5,102, the median income \$4,000. In Shelby, Indiana, a rural area, the average annual net income was \$2,744.⁵⁵

Compared with the average occupational income, dentists' incomes are much the higher, but in comparison with professional incomes they are not excessive. Dentists depend, in the last analysis, upon the income above subsistence levels distributed among the people. When general economic conditions are depressed and surpluses in consumers' incomes are wiped out, dentists' services are seriously curtailed, despite the continued need for dental care.

Judged strictly on the basis of relative income, dentists have a preferred position in the occupational world. In terms of social need to maintain the health of the people, much more

⁵³ Lewis W. Jones, "Dentistry," *Encyclopaedia of the Social Sciences*, The Macmillan Company, New York, 1935, III, 92.

⁵⁴ Paul A. Dodd, "Economic Aspects of the Practice of Medicine in California," manuscript, p. 314 ff.

⁵⁵ Allon Peebles, *A Survey of the Medical Facilities of Shelby County, Indiana, 1929*, The Committee on the Cost of Medical Care, Publication No. 6, pp. 60-61; also Nathan Sinal, D.P.H., and Alden B. Mills, *A Survey of the Medical Facilities of the City of Philadelphia, 1929*, The Committee on the Cost of Medical Care, Washington, D.C., 1931, p. 9.

dental service is essential. The dilemma is found in the inability of the majority of people to pay privately the costs of adequate dental care and in the fact that free service clinics are few, badly located in relation to population, and undermanned. Public policy is undergoing considerable change, and although dentistry has not yet been added to the growing list of services socially provided, under either a public or a semi-public plan, the trend points to such a solution. If this is found, and the dental needs of the people are provided, the present number of practicing dentists, dental technicians, and oral hygienists will be found woefully inadequate.

Dentistry is truly an expanding occupational group in which new entrants may expect to secure employment, to render professional service, to enjoy a preferred social-economic position, and to receive above-average remuneration.⁵⁶

Veterinarians

The number of veterinarians in 1930 was 11,863; this was .02 per cent of all gainful workers, and .4 per cent of all professional persons. From only 1,166 such workers listed in 1870, the number increased to a maximum of 13,494 in 1920, and declined in the last decade to approximately the same as that of 1910.

During the period of agricultural development and settlement of the land, the growth of cities, and the expansion of transportation and communication prior to 1910, the number of draft animals in use grew rapidly.⁵⁷ But with the introduction of mechanical means of locomotion draft animals have largely disappeared from cities, and the number on farms has been greatly reduced. This inevitably took practice away from veterinarians, whose work had been so closely identified with horses that they were frequently called "horse doctors." True, the number of veterinarians in scientific work in government agricultural schools and laboratories has increased, and the larger number and better care of dairy and meat herds have considerably increased their work. Despite these conditions and the growing small-animal practice, the number of veterinarians does not increase in proportion to either the expansion

⁵⁶ "Dentistry," National Occupational Conference Abstract in *Occupations*, February 1939, p. 418, states: "It is interesting to note that practically all references stress the fact that dentistry offers an excellent future for women, especially in children's dentistry, with a growing field in school work."

⁵⁷ *Statistical Abstract of the United States, 1936*, Department of Commerce, Table 590, p. 609.

of the total population or the total of gainful workers, or in comparison with other professions.

In view of these long-time trends it would appear that the number of such workers had almost reached its peak, and that relatively fewer will be added to the ranks. In fact, it is probable that only enough entrants will be needed to supply the replacements in this occupation for the time being. But some writers forecast that long-run indications are very favorable to the career of veterinary medicine. Predictions are based on the fact that there are only about 12,000 veterinarians in the United States, while the number of practicing physicians is about 140,000; yet the number of farm animals is over three times that of the number of human beings and this figure does not include pets which are potentially veterinary patients. As the public realizes the need for veterinary medicine, the demand for the veterinarian's services will grow.⁵⁸

Chemists, Assayers, and Metallurgists

One of the newer and rapidly expanding occupational groups is that comprising chemists and persons using chemistry, such as assayers and metallurgists. In 1930 their number was 47,068, and they were .10 per cent of all gainful workers and 1.6 per cent of all professional persons. Their number was less than a thousand in 1870, and advanced rather slowly until the turn of the century. Then, with an increasing knowledge of chemistry and its application to industrial processes, their number increased rapidly. However, it was not until the World War that American dependence upon foreign countries for dyes and other chemical products used in manufacture brought forcefully home to us our great lack of industrial chemists. "In the earlier years of this century," says Dr. Robert E. Swain, head of the Chemistry Department of Stanford University, "employment opportunities for chemists were limited almost entirely to teaching."⁵⁹ The great chemical discoveries of the decade 1880-1890 were forerunners of the applied chemistry which found its way out of the laboratory and into the factory at or shortly after the World War. The need for synthetic products, the development of mass production, and the technological changes occurring about that time gave American

⁵⁸ "The Veterinarian," National Occupational Conference Abstract in *Occupations*, December 1938, p. 223.

⁵⁹ Robert E. Swain, "Chemistry and Physics," in *University Training and Vocational Outlets*, edited by C. Gilbert Wrenn, Stanford University, 1935, p. 15.

manufacture an unusual opportunity to avail itself of the expanding markets of commerce.

From a very few in 1910 scientific laboratories in industrial plants had increased in 1930 to over 800. No longer is industry content to capitalize private invention. Instead, it develops its own processes. Chemists and other research specialists, employed full time by manufacturing concerns, with ironclad contracts covering the period of their employment and reserving the product of their research for the companies which employ them, are now salaried workers in industry.

Chemists are also found in the field of industrial management and engineering, in which their training as chemists is combined with business operations. An increasing number are finding their way into government service in an ever widening variety of operations—in agriculture and animal husbandry, in food- and drug-law enforcement, in hospital laboratories, and so forth.

The number of chemists at work directly in strictly chemical manufacturing plants, however, is comparatively small. The total number of salaried workers in the sulphuric, nitric, and mixed acid industries in 1925 was only 389,⁶⁰ and this number is made up largely of business and supervisory personnel. There were 598 chemical plants in the country in 1934, only 133 of which had over 100 employees. Even within these chemical industries a few large companies dominate, the E. I. du Pont de Nemours Company alone employing 41,000 workers in 1935. It would appear, therefore, that industrial chemists are to be found working primarily as laboratory research workers and applied research men in industries where they are a very small but indispensable part of the labor force.

The future for the professional chemist depends largely upon the development of the industrial business structure. In fact, as technology looms continually larger, and as the industrial process becomes dominant in the whole economic life of the nation, the importance of experimental applied chemistry grows enormously. Modern industry requires an increasing range of equipment, appliances, and consumers' products, much if not most of which cannot be developed without the aid of chemistry and its allied science of physics.

Industry finds it impractical to await the application of re-

⁶⁰ T. J. Kreps, *The Economics of the Sulfuric Acid Industry*, Stanford University Press, 1937, p. 228.

search findings as they come from the pure science laboratories of the universities. It seeks short cuts to commercial production in which the fundamentals of the sciences will be applied in the most expeditious manner. For this task manufacturers increasingly demand the services of qualified professional chemists. But, in doing so, modern business applies its own standards and demands a steady output of laboratories operated as an integral part of industry itself. Much of the research is made up of details which fit into the industrial process, and chemists so employed are regarded as salaried workers in business enterprise.

That there will be an increasing demand for such workers as industrial expansion takes place is quite likely. But, judging by the labor force already engaged as professional chemists, and the trend which has produced it, there is little prospect short of striking changes in industry for modern business to require and use any greater number of chemists in comparison to the total body of gainful workers. If the increase made during the past ten years is maintained, an addition of such workers may be expected. This gain would represent a slightly faster rate of increase for the chemist group than that for all gainful workers.

Technical Engineers

The total number of technical engineers listed under professional occupations in the census of 1930 was 226,249. This was .46 per cent of all gainful workers, and 7.7 per cent of all professional persons. This group is comparatively new in the professional life of the United States. Engineering is a natural accompaniment and outgrowth of our modern intensive industrial development, in which diversification of labor and a high quality of performance are essential. From a mere handful in 1870, the number of technical engineers increased rapidly, especially after 1900. The greatest decennial gain was in the 1920-1930 decade, when 66 per cent more such workers were added to the labor force.

During the nineteenth century engineers were engaged in private practice, as consultants and advisers, and in independent construction. But the intensive construction and manufacturing era ushered in by mass-production methods early in the present century brought about a decided increase in the number of engineers and resulted in their employment as

salaried workers for large companies.⁶¹ They became the technical leaders, and their ranks increased more rapidly than those of other industrial groups. From 1870 to 1920 the proportion of administrative-technical personnel grew from 1.2 per cent of all industrial workers to 3.6 per cent.

The number of engineers working as salaried employees has increased enormously; this probably could not have taken place had engineers remained private consultants on an independent, fee basis, without any continued responsibility for the firm's success. But certain marked disadvantages have resulted from their changed status. The loss of private practice has decreased average earnings and restricted working opportunities. More than that, it has prevented engineers from sharing in company profits, except in a few isolated instances where bonus plans are in operation. It has likewise subjected them to the fluctuations in employment and work consequent upon the rise and fall of the business barometer. As Miss Brown reports, "The history of the last five years appears to indicate that engineers and architects are likely to be more at the mercy of economic variations than are the professions that offer services directly to individuals."⁶² The American Society of Civil Engineers estimated that at the end of 1933 unemployed civil engineers totaled 50,000, or approximately half of their entire number; nearly 30,000 had been out of work for at least a year, and 12,000 for two years or more. Their employment situation showed some improvement in 1934 and 1935.

It is possible to segregate the several kinds of professional engineers into four groups, for which the census offers data for 1910, 1920, and 1930. The facts are presented in the following display:

	1910	1920	1930
Electrical engineers	15,278	27,077	57,837
Percentage of technical engineers...	17.2	19.9	25.6
Mechanical engineers	14,514	37,689	54,356
Percentage of technical engineers...	16.4	27.7	24.0
Mining engineers	6,930	6,695	11,970
Percentage of technical engineers...	7.8	4.9	5.3
Civil engineers and surveyors.....	52,033	64,660	102,086
Percentage of technical engineers...	58.6	47.5	45.1
Totals	88,755	136,121	226,249
	100.0	100.0	100.0

⁶¹ Esther Lucile Brown, *The Professional Engineer*, Russell Sage Foundation, 1936, pp. 82-86. An excellent short treatise of the engineering profession, from which data submitted here have been taken.

⁶² *Ibid.*

In 1930 civil engineers and surveyors were numerically the most important group, being 45 per cent of all engineers. Electrical engineers were next, mechanical engineers third, and mining engineers fourth. They maintained their relative positions for the three decades. Electrical engineers experienced the most rapid growth, showing a gain of 278 per cent; mechanical engineers were second with a gain of 274 per cent, civil engineers third with a gain of 96 per cent, and mining engineers last with a gain of 72 per cent.

Engineers tend to be distributed geographically according to population and the location of industrial centers.⁶⁸ Almost 40 per cent of engineers, as shown by membership in the respective engineering professional organizations, are located in the Middle Atlantic region, and well over half are found at work in that section and the east north-central part of the United States. Relatively few, not over 6 per cent, are found in the agricultural South.

The census of 1930 permits segregation of engineers by their number and proportion in the various industrial groups, which offers certain pertinent information concerning the type of industrial enterprise in which they are used. The available data are assembled in Table 261.

The proportion of professional expert engineers required to man the economic enterprise of modern America is not large, averaging for all industries less than one per cent of all workers. That their number gives relatively little indication of their strategic importance in enterprise is hardly to be questioned. It is interesting to observe that 26 per cent of all engineers are still engaged in private practice, in research, teaching, and other professional pursuits. While the number in the public service increased substantially in the years 1910-1930, even by 1930 it totaled only 12 per cent of all engineers.

Engineers are required in an increasing number of different businesses. Of all types of enterprise, as grouped by the census data, the proportion of engineers to total workers engaged in the industry is greatest in metallic mining (5.2 per cent); least in trade (.02 per cent). Even in the chemical factories their number comprises only 1.3 per cent of the labor force. Coal mining makes relatively little use of professional engineers, the methods of mining, so far as workers are concerned, calling for few such high-grade persons.

⁶⁸ Esther Lucile Brown, *op. cit.*, pp. 60-62.

TABLE 261

ENGINEERS: NUMBER, PERCENTAGE, AND PROPORTION OF ALL WORKERS
ENGAGED IN SPECIFIC INDUSTRIES, 1930*

Industry	Engineers		Percentage of All Indicated Workers
	Number	Percentage	
Professional service	53,641	26.5	1.8
Public service	24,890	12.2	2.4
Wholesale-retail trade	1,194	.6	0.02
Insurance	1,821	.9	0.4
Telephone and telegraph	12,668	6.3	2.2
Water transportation	1,325	.7	0.4
Steam railways	10,431	5.2	0.7
Street railways	1,535	.8	0.8
Construction of roads	15,104	7.5	3.3
Electric light and power plants	12,357	6.1	4.3
Gas works	1,343	.7	1.2
Building industry	16,490	8.2	0.6
Coal mines	2,355	1.2	0.3
Oil and gas wells	1,751	.9	0.9
Other mines	1,803	.8	5.2
Other iron- and steel-machinery factories	12,476	6.2	1.0
Blast furnaces and roll mills	4,124	2.0	0.7
Automobile factories	4,537	2.2	0.7
Electrical machinery, etc.	12,526	6.2	3.3
Other miscellaneous manufacturing industries	4,722	2.3	0.5
Other chemical factories	2,406	1.2	1.3
Petroleum refineries	2,549	1.3	1.5
Total	201,870	100.0	0.9

* *Fifteenth Census of the United States, 1930, "Occupational Statistics,"* reprint of chapter 7, Vol. V., *Fifteenth Census* reports. The chapter represents the second attempt by the Bureau of Census to classify the gainful workers both by industry and by occupation.

Of all industries or groups of industries which engage the attention of 5 per cent or more of the engineering profession (see Table 261), the only ones not expanding rapidly are steam railways, building, and iron and steel machinery factories. If business recovery from the depths of 1933 continues, it can be expected that a larger number of engineers will be required in various professional pursuits, such as public service, telephonic and telegraphic communication, electrical-power generation and distribution, road construction and repair, iron and steel blast furnaces and rolling mills, and electric-machinery factories. If public enterprises such as the federal housing program become extensive, even the building industry may again experience an expansion which will call for more engineering service.

In 1930, there were 9,818 consulting engineers in private practice. They constituted 4.3 per cent of all engineers listed by the census that year. Their average per capita income with-
drawals, which represent income from their professional practice, totaled \$8,523 in 1930,⁶⁴ a decline from the peak of \$10,412 in 1929; by 1934 the continuous drop during depression years had fallen to \$3,500. It thus appears that consulting engineers, who are so greatly favored by exceptionally large incomes during prosperous times, suffer very substantial reductions during depressions.

A study made in 1925 reveals some important information concerning engineers' salaries. Their incomes depend considerably upon experience. The period of rapid increase in income is from age 25 to 35, then a period of slower increase is experienced from 35 to 45 years of age, and this is followed by a period of declining incomes. The available data are given in Table 262. These data are for those engineers who remain

TABLE 262
ANNUAL EARNINGS IN 1924 OF ENGINEERING GRADUATES*

Graduation Year	Years of Employment	Annual Earnings in 1924			
		Minimum	Median	Maximum	Most Frequent
1924 .....	...	\$ 300	\$1,475	\$ 4,080	\$1,200
1922	2	360	2,100	9,000	1,800
1919	5	1,500	2,860	25,000	3,000
1914	10	1,200	4,000	50,000	5,000
1904	20	1,920	5,500	49,500	6,000

* Esther Lucile Brown, *op. cit.*, p. 70.

in the profession. They do not take account of that substantial number who, from either necessity or choice, have left engineering for other forms of occupational endeavor.

For the period 1920-1936 Harold Clark reports the average earnings of employed engineers at \$4,410, the median annual earnings at \$3,700, the upper quartile at \$5,620, and the lower quartile at \$2,550.⁶⁵

In comparison with the average gainfully employed worker, professional engineers average high incomes. In fact, the typi-

⁶⁴ *National Income in the United States, 1929-35*, United States Department of Commerce, p. 216.

⁶⁵ Harold Clark and Associates, *Life Earnings in Selected Occupations in the United States*, Harper & Brothers, New York, 1937, p. 50.

cal newly employed graduate began his professional career in 1924 at a figure considerably above that received by the average gainfully employed male. After five years employment his average was more than twice as much as that of the average gainfully employed male, and by the end of the tenth year he occupied a preferred status above that achieved by 97.1 per cent of all gainful workers at the peak of 1929 prosperity.⁶⁶ Of course, there were below-average engineers in all age groups, whose incomes were extremely low; but they are not typical of the profession. At the other extreme are those very exceptionally circumstanced engineers who achieve incomes of \$25,000 or more, but they, too, are relatively rare.

In 1926, another study showed that 60 per cent of engineering graduates enter industrial work through engineering design or construction in comparatively unimportant jobs; 14 per cent secure beginning employment as clerks or timekeepers on construction; 11 per cent go into research and teaching; 9 per cent start in subordinate managerial positions. After ten years the scene has shifted considerably. Less than 20 per cent still remain in design and construction jobs, and almost half have secured managerial positions.⁶⁷

Judged by the trends of engineering occupations as shown in the census tables, the preferred incomes received by such workers, the expanding character of industry which requires their services, and their strategic importance in economic development, it appears safe to predict that the engineering professions will continue to expand in the immediate future. They offer exceptional opportunities for aspirants to professional status and should prove attractive to them, and beneficial to the society which makes use of their service.⁶⁸

Other Professional Pursuits

The number of professional workers other than those separately listed in the census, is made up of three major groups: librarians, social workers, and others. The total was 108,796 in 1930, which was .09 per cent of the population, .2 per cent of all gainful workers, and 3.7 per cent of the Professional cate-

⁶⁶ *Ibid.*, p. 54.

⁶⁷ Boynton M. Green, "Engineering," in *University Training and Vocational Outlets*, edited by C. Gilbert Wrenn, Stanford University, 1935, p. 28.

⁶⁸ Useful material relating to mining engineering and to metallurgical engineering is contained in a leaflet of the NYA of Wisconsin, 149 East Wilson Street, Madison, Wisconsin, April 1937.

gory. This group has grown rapidly, especially since the turn of the century. Society requires an increasing number of professional workers, and within the whole realm of occupational activity a growing number of occupations are acquiring that thoroughness of preparation and proficiency of performance which characterizes the true profession. The number and percentage distribution of the three components of this group for 1910, 1920, and 1930 may be seen in the following display:

Group	1910		1920		1930	
	Number	Percent- age	Number	Percent- age	Number	Percent- age
Librarians	7,423	47.3	15,297	45.4	29,613	27.2
Social and Welfare Workers .....	.....	....	.....	....	31,241	28.7
Other occupations	8,254	52.7	18,409	54.6	47,942	44.1
Total	15,677	100.0	33,706	100.0	108,796	100.0

Librarians.—In 1930, Librarians made up 27 per cent of the Other Professional Pursuits group. The first public library was opened in Boston in 1850, and since then the growth in libraries, both public and private, has been astounding. Today, in addition to such general institutions there are special research, professional, and school libraries. State-wide plans of library service exist in many states, where traveling units and librarians are found. By 1930 there were 6,500 public, 700 college and university, and 1,500 special business and professional libraries in the United States and Canada.⁶⁹ While approximately 85 per cent of all librarians are women, men find increasing opportunity in administrative and research posts. Formerly librarians were simply clerks and learned their work by experience; but professional training began in 1887 with the opening of the first library school at Columbia University.⁷⁰

The turnover among librarians is marked. It is estimated that their average length of service is six years. In a profession so largely made up of women, and one in which most of the new entrants are young women of marriageable age, such a turnover seems inevitable. However, as the work becomes professionalized, there is a tendency for tenure to extend.

⁶⁹ Institute for Research, "Research No. 8, Librarianship," *Research in the Professions and Vocations*, Chicago, Illinois, 1930.

⁷⁰ W. H. Cowley, *The Profession of Librarianship*, American Council on Education, Washington, D.C., 1928.

The beginning salary of the typical college-graduate, trained librarian ranges from \$1,800 to \$2,200. Weekly hours of duty range from 41.7 hours on the average in Class A libraries (those having in excess of 100,000 volumes) to 44.6 hours in Class D institutions (those with less than 20,000 volumes). The range of salaries in the different classes of libraries in 1928 was as shown in Table 263.

TABLE 263
RANGE OF SALARY*

Position	Class A (100,000-plus Volumes)	Class B (50,000 to 100,000 Volumes)	Class C (20,000 to 50,000 Volumes)
Librarian	{ \$3,000-\$8,000 (Av. \$4,590)	{ \$1,500-\$4,000 (Av. \$2,718)	{ \$ 800-\$3,300 (Av. \$2,053)
Assistant Librarian ..	{ \$1,750-\$5,000 (Av. \$3,104)	{ \$ 750-\$2,500 (Av. \$1,734)	{ \$ 900-\$2,000 (Av. \$1,428)
Department Head	{ \$1,000-\$3,300 (Av. \$2,065)	{ \$1,000-\$2,200 (Av. \$1,798)	{ \$1,020-\$1,500 (Av. \$1,368)
Department Librarian	{ \$ 900-\$2,400 (Av. \$1,538)	{ \$ 900-\$1,900 (Av. \$1,475)	{ \$1,400-\$2,400 (Av. \$1,706)
Assistant	{ \$ 850-\$2,700 (Av. \$1,519)		

* W. H. Cowley, *The Profession of Librarianship*, American Council on Education, Washington, D.C., 1928, p. 52.

The profession of librarian is so new and replacements are as yet so numerous that it offers many opportunities for employment, and final determination of remuneration in it has not been made. Top-flight salaries compare favorably with other professional incomes, especially those of teaching, medical, and dental occupations. On the whole, however, compensation of librarians has not been adequate in view of the required preparation and training. Salaries have always been notoriously low, even in the boom days before the depression.⁷¹

In 1935 the number of unemployed librarians was less than in any year since 1931, nearly all library schools reporting more rapid placement of graduates than in any year since 1930.⁷² In 1936 employment conditions showed a slight improvement and salaries only a very slight increase.

While one-third of the country has no local facilities and

⁷¹ "Highly Trained but Poorly Paid," *Library Journal*, February 15, 1936, p. 36.

⁷² "Increase in Employment among Librarians," *Monthly Labor Review*, July 1936, p. 50.

another one-third is but inadequately served with libraries, there is good reason to expect in the long run a future increase in the number of librarians.⁷³ There is a greater demand for librarians in certain special fields, especially school librarians. For well-trained men, particularly, the library profession is offering increasing opportunities.

Social and Welfare Workers.—This group has emerged as a separately enumerated profession in the group of "Other Professional Pursuits" in the census of 1930. Prior to that time they were included with the semiprofessionals in the group of religious, and charity and welfare workers. While the methods of census classification obscure the trends in the number of social workers, it is apparent that their number has increased with unusual rapidity as greater emphasis has been placed on an adequate care of the socially unfortunate. The number of agencies both public and private and the number of clients reached by these agencies have been growing as more people have become dependent upon an impersonal economic system which shows little regard for its workers who, for one reason or another, are forced out of gainful employment.

Social work is increasingly assuming the nature of applied science, in which social workers become social engineers, planning the environment of a people so that the best elements in our culture will prevail. Technically, professional social workers are divided into those who work in public and private agencies devoted primarily to one or another of the following types⁷⁴ of service:

Child welfare	Recreation and neighborhood
Family welfare	activities
Health work	Work with delinquents
Industrial welfare	

The 1930 census included 76 titles representing different occupations listed within the group of Social Workers.⁷⁵ In a more inclusive enumeration of such workers than the census makes under that category, Hurlin found that they totaled at least 40,000, not including the more than 15,000 public-health

⁷³ "Report on Unemployment Prevention and Reemployment," *Library Journal*, February 1, 1936, p. 104.

⁷⁴ Emma P. Hirth, *Training for the Professions and Allied Occupations*, Bureau of Vocational Information, New York, 1924, pp. 667-77.

⁷⁵ Ralph G. Hurlin, *The Number and Distribution of Social Workers in the United States*, Russell Sage Foundation, New York, 1933, p. 1.

nurses elsewhere classified. He estimates that approximately a fourth of all social workers so listed are men, three-fourths women. This profession is primarily a city calling. Social workers are over three times as numerous in large cities as in the rest of the country.

Social work is an emerging profession. Specialized training on the college and university level is a new development in the past twenty years, with some thirty institutions now offering special courses in this type of work. But as yet a substantial proportion—60 per cent of the men and 40 per cent of the women in this calling in 1926 as reported by Walker's study—were without special education on the college level or above.⁷⁶ As the work becomes more exacting and much of it subject to Civil Service examination, the necessity for professional preparation becomes imperative and the process of replacing poorly prepared social workers with professionally trained ones gains momentum.

A study made in 1925 by the Russell Sage Foundation, covering 2,100 persons in 129 different organizations situated in 81 cities in the United States, showed the median annual salary of full-time social workers to be \$1,517.⁷⁷ Elementary school teachers in large cities in that year had a median salary of \$1,844. The two occupations had been about equal in salary in 1913, but social workers had lagged behind while a more professional income was being established for school teachers. In the study referred to only 5.8 per cent of the women but 57 per cent of the men received annual salaries of \$3,000 or more; 22 per cent of the women and 21 per cent of the men received between \$2,000 and \$3,000; 70 per cent of women social workers received from \$1,000 to \$2,000; the lowest range recorded for men was from \$1,250 to \$2,000, with 21 per cent located within that salary range; and a few, 1.6 per cent of women social workers, received less than \$1,000 in 1925.

The percentage of social workers by type of work appears in Table 264.

While social case work leads the field, group work also engages the attention of a substantial percentage of all the workers. Among men 71 per cent are in executive or subexecutive positions, among women 33 per cent. Only 6 per cent of men

⁷⁶ Sydnor H. Walker, *Social Work and the Training of Social Workers*, University of North Carolina Press, 1928, p. 105.

⁷⁷ *Ibid.*, p. 118.

TABLE 264

PERCENTAGE OF MEN AND WOMEN WORKERS ENGAGED IN VARIOUS TYPES
OF SOCIAL SERVICE WORK, 1925*

Type	Men	Women	Total
Social case work	41.0	65.0	60.0
Group work	17.0	12.0	13.0
Health work	11.0	10.0	11.0
Organization work	15.0	5.0	7.0
Industrial case work	5.0	4.0	4.0
Institutional work	7.0	2.0	2.0
Research and teaching	3.0	1.0	2.0
Promotion and reform	1.0	1.0	1.0
Total	100.0	100.0	100.0

* Sydnor H. Walker, *op. cit.*, p. 122.

are engaged in supervisory positions, while such work engages the attention of 18 per cent of the women. Only 23 per cent of men social workers are staff members engaged in program or routine duties, whereas this type of work is followed by 49 per cent of all women who are employed in social work.

A very substantial percentage of men, and a goodly proportion of women social workers, are in a preferred position in comparison with the average employed person as judged by income. Their work carries social importance and prestige; it is rapidly acquiring a professional character based upon specialized training and experience. Judging by the occupational trends to date, and more particularly by the unusual extension of public and private relief during the depression and the emphasis upon the social-security program of the federal and state governments, there is every reason to expect a great expansion in the number of social workers in the future. As this profession assumes its proper place in our modern society, it will probably engage the attention of proportionately more of all gainful workers than formerly. Its standards of training are being rapidly raised, and new entrants will be forced increasingly to qualify as professional persons.⁷⁸

⁷⁸ See H. Dewey Anderson, "The Place of Social Work in Our Present-Day Economy," *California Conference of Social Work Bulletin*, August 1938. Also "Trends in Occupation for Women," *Occupations*, November 1937:

"In the field of social work, the demand for personnel is reported to be currently too great for the colleges and training schools to satisfy. The demand may be directly attributed to the recent expansion of public welfare agency activities. Moreover, the American Association of Social Workers recently predicted increasing opportunities in agencies other than those administered by the government. Whether or when relief expenditures will be curtailed, and what will happen to many social workers engaged in relief activities should such curtailment come, is a matter for serious conjecture."

Semiprofessional and Recreational Pursuits

Certain emerging professions which have not yet secured either sufficient numerical importance or a recognized professional character for inclusion in the Professional Service group have been classed by the census as semiprofessions. This group totaled 171,773 in 1930, which was .3 per cent of all gainful workers, and 5.8 per cent of the entire Professional group. During the past twenty years these semiprofessional occupations have grown rapidly.

A percentage distribution of these subgroups is as follows:

Group	1910		1920		1930	
	Num-ber	Percent-age	Num-ber	Percent-age	Num-ber	Percent-age
Architects', Designers', and Draftsmen's Apprentices	1,153	1.7	3,777	3.1	2,656	1.5
Apprentices to Other Professional Persons .....	....^a	....	....^a	....	3,935	2.3
Billiard Room, Dance Hall, Skating Rink, etc., Keepers	16,761	24.7	24,897	20.4	29,129	17.0
Chiropractors .....	....^b	....	....^b	....	11,916	6.9
Directors, Managers, and Officials in Motion-Picture Production .....	....^c	....	....^c	....	1,923	1.1
Healers (not elsewhere classified)	6,834	10.1	14,774	12.1	17,640	10.3
Keepers of Pleasure Resorts, Race Tracks, etc.	2,929	4.3	3,360	2.7	10,718	6.2
Officials of Lodges, Societies, etc.	8,215	12.1	11,736	9.6	14,515	8.5
Radio Announcers, Directors, Managers, and Officials .....	....^d	....	....^d	....	1,819	1.1
Religious Workers	15,970	23.5	41,078	33.6	31,290	18.2
Technicians and Laboratory Assistants .....	....^e	....	....^e	....	15,988	9.3
Theater Owners, Managers, and Officials	11,322	16.7	18,395	15.0	19,723	11.5
Other Occupations	4,720	6.9	4,257	3.5	10,521	6.1
Total	67,904	100.0	122,274	100.0	171,773	100.0

^a Included in the group "Other Apprentices" in "Manufacturing and Mechanical Industries" in 1920 and 1910.

^b Chiropractors were included in the group "Healers (Except Osteopaths and Physicians and Surgeons)" in 1920 and 1910.

^c "Directors, Managers, and Officials in Motion-Picture Production" were included in the group "Theater Owners, Managers, and Officials" in 1920 and 1910.

^d Not shown prior to 1930.

^e Most of the "Technicians and Laboratory Assistants" in 1920 and 1910 were distributed among three groups—"Semiskilled Operatives in Other Chemical Factories"; "Other Occupations" under "Semiprofessional Pursuits"; and "Other Clerks" under "Clerical Occupations."

The rate of growth has not been identical for all subgroups for the period under review. However, only two—Architects', Designers', and Draftsmen's Apprentices, and Religious Workers—are actually showing a decline in numbers. The former indicate the passing of the apprentice system of acquiring status in the occupations indicated. The decline in the number

of religious workers probably represents the passing of such occupations as nonprofessional or only partly professional social work connected with religious denominations and societies. Professional social workers are taking their places, as was indicated earlier in this chapter.

Data for the other subgroups are not always sufficient to depict a trend.⁷⁹ But it would appear that modern America is finding considerably more place for commercial amusements requiring a larger labor force to man such enterprises.⁸⁰

Attendants and Helpers

Since 1910, the census has listed those persons who are attendant upon professional workers. Their number in 1930 was 170,384, and they were .3 per cent of all gainful workers and 5.8 per cent of all persons included in the Professional Service group. The changes in classification, rather than any startling increases in numbers of persons in the various occupations in this group, account for most of the numerically important shifts noted from 1920 to 1930. The 1910-1930 distribution of workers in the subgroup captioned Attendants and Helpers is shown on page 559.

The numerically important groups are laborers at work in amusement places and for other professional persons; doctors' and dentists' assistants; attendants at pool rooms, bowling alleys, and golf links; and theater ushers. Of those groups for which data are available from 1910 on, all are increasing in number except library assistants and attendants whose places are being taken either by trained professional librarians or by service equipment such as hauling wagons to transport books, and so forth, and stage and circus hands who have declined in number with the closing of many legitimate theaters and the

⁷⁹ A leaflet on the clinical laboratory technician was put out by the NYA of Wisconsin, Madison, Wisconsin, September 1937. See also Gladys M. Relyea, "The Clinical Laboratory Technician," *Occupations*, December 1936.

⁸⁰ In 1935 there were 14,561 persons employed in the United States in 625 broadcasting stations, a number of stations that is said to have about reached the saturation point. Artists and announcers totaled 5,864, or nearly one-half of all station employees. Receipts of broadcasting firms steadily grew from 1933 to 1935, and are increasing. Change in taste may differentiate programs, calling for more jobs. However, musical programs play an increasing part in the national radio diet, and such programs are easily "mechanized" by recordings and chain broadcasts. Wider use of educational content may increase the number of "live" instructors of all kinds, since public interest in current affairs seems to be growing. While women are as yet engaged in clerical work for the most part, those with excellent voices should find increasing opportunities in broadcasting. Best opportunities for initial jobs are said to be in writing script of distinction; but except for persons of unusual talent broadcasting is to be regarded as a limited field. Avenues to advancement are jammed with unpaid aspirants. (From "Radio Broadcasting," *Occupations: A Series of Vocational Studies*, NYA of Illinois [W. J. Campbell, State Director], pp. 7, 28.)

perfection of many automatic or semiautomatic devices for moving scenery and equipment.

The number of assistants to doctors and dentists has increased rapidly; for, as the practice of these professions grew, with a greater dependence upon elaborate equipment and technique, efficiency was greatly enhanced by the use of

Group	1910		1920		1930	
	Num- ber	Percent- age	Num- ber	Percent- age	Num- ber	Percent- age
Attendants in Pool Rooms, Bowling Alleys, Golf Clubs, etc. ^a	.....	.....	.....^a	.....	16,168	9.5
Dentists' Assistants and Attendants	2,048	11.0	6,708	21.2	13,715	8.0
Helpers, Motion-Picture Production .....	.....^b	.....	.....^b	.....	2,213	1.3
Laborers, Recreation and Amusement .....	.....^c	.....	.....^c	.....	29,893	17.5
Laborers, Professional Service .....	.....^c	.....	.....^c	.....	25,383	14.9
Librarians' Assistants and Attendants	3,299	17.7	2,279	7.2	1,865	1.1
Physicians and Surgeons' Attendants	4,140	22.3	7,051	22.2	14,042	8.2
Stage Hands and Circus Helpers	6,836	36.8	5,803	18.3	4,274	2.5
Theater Ushers	2,278	12.2	5,221	16.5	12,461	7.3
Other Attendants and Helpers .....	.....^d	.....	4,650	14.7	50,370	29.6
Total	18,601	100.0	31,712	100.1	170,384	99.9

^a Included, in 1920 and in 1910, in the group "Bell Boys, Chore Boys, etc.," in Domestic and Personal Service.

^b Included, in 1920 and in 1910, in the group "Semiskilled Operatives." Other miscellaneous industries in "Manufacturing and Mechanical Industries."

^c "Laborers, Professional Service"; "Laborers, Recreation and Amusements"; and "Laborers, Domestic and Personal Service" comprised the 1920 and 1910 group "Laborers, Domestic and Professional Service."

^d Comparable figures for 1910 not available.

competent assistants.⁸¹ The number of ushers grew rapidly as the cinema became popular. Again, the increase in number of laborers and attendants in places of amusement attests the growing dependence upon commercial recreation. There is every possibility, as judged by the expansion taking place in those professions upon which these helpers, assistants, and laborers depend, that this subgroup comprising professional aides will continue to grow in size.

⁸¹ See *The Dental Assistant*, Occupational Information Series, University of the State of New York, Albany, New York, Monograph Number 3, February 1938.

CHAPTER X

DOMESTIC AND PERSONAL SERVICE

General Characteristics (Tables 265 to 269, Charts 1, 6, and 14)

The group designated Domestic and Personal Service is a major occupational group constituting 5,255,803 persons in 1930. It was 4.3 per cent of the entire population and 10.8 per cent of all gainful workers, and increased in numbers in each successive census decade from 1870 to 1930. However, despite this rapid expansion, in relation to the total gainful labor force Domestic and Personal Service increased disproportionately. In fact, except for the war years when other occupations were more remunerative or attractive, Domestic and Personal Service remained at approximately 10 per cent of all gainful workers in the decades from 1890 to 1930.

Within the category of Domestic and Personal Service the numerically dominant group is Servants, Waiters, Housekeepers, and Stewards, which comprised 50 per cent of the whole category in 1930. Thus, although this group is but one of the thirteen groups comprising the major occupational classification, whatever happens to it tends to affect the trends in the total category. The second most important group numerically was Laundry Operatives and Managers, which was 12 per cent of the total in 1930. All other groups were less than 10 per cent each of Domestic and Personal Service.

Numerically all groups increased substantially from 1870 to 1930. But not all groups fared alike. For example, a maximum number of restaurant, café, lunch-room, and saloon keepers was recorded in 1910, after which year their number diminished sharply as a result of the Prohibition Amendment. Certain trends toward larger establishments and a smaller number of hotels and boardinghouses reduced the number of managers and operators.

Within the body of workers offering domestic and personal service important shifts occurred after 1870. Barbers, hairdressers, and manicurists became much more prominent, increasing from 2 per cent of the number of all such workers in 1870 to 7 per cent in 1930. The kind of work performed by those engaged in domestic and personal service changed so

DOMESTIC AND PERSONAL SERVICE

561

TABLE 265
NUMBER AND PERCENTAGE DISTRIBUTION OF ALL GAINFUL WORKERS, MALE
AND FEMALE, IN DOMESTIC AND PERSONAL SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Barbers, Hairdressers, and Manicurists			84,982 8.9	131,116 4.7		216,211 6.1	374,290 7.1
Boarding- and Lodging- house Keepers			44,349 2.0	71,281 2.6		133,392	144,371 2.7
Hotelkeepers and Managers		2.2	44,076 2.0	54,797 2.0		1.6 21,667 .6	1.1 88,118 1.7
Cleaning and Dyeing Workers, and Pressers...						40,713 1.1	67,614 1.3
Elevator Tenders						1,721,543 48.7	2,649,167 50.4
Servants, Waiters, House- keepers, and Stewards...	1,000,417	1,155,351 75.9	1,546,827 70.2	1,715,874 61.8		178,623 5.1	309,025 5.9
Janitors and Sextons		9,212	26,538 1.2	56,577 2.0		664,004 17.3	531,163 15.0
Laundry Operatives and Managers			248,462 11.3	13.9		215,370 5.6	305,897 8.7
Midwives and Nurses ...			47,586 2.2	120,956 4.4		84,128 2.2	88,168 2.5
Porters							
Restaurant and Lunch- Room Keepers, Saloon Operators, and Bar- tenders							
Garbage Men							
Other Domestic and Per- sonal Service Pursuits.							
Total							

* For later figures relating to actually employed persons, for certain of these categories, see *Census of Business: 1935*, "Service Establishments, United States Summary," and *Retail Survey for 1935*.

greatly that even though the number of house servants and waiters increased substantially, a diversification of labor in the field of personal service reduced the proportion of the entire category from 83 per cent in 1870 to 50 per cent in 1930. Part of this shift was caused by the commercial laundry, which did away in large part with the washerwoman who made her rounds doing the family laundry in the home. Laundry workers increased from 5 per cent of Domestic and Personal Service in 1870 to 12 per cent in 1930. The care of the sick has also changed greatly. Whereas formerly family relatives did most

DOMESTIC AND PERSONAL SERVICE

TABLE 266
NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS IN
DOMESTIC AND PERSONAL SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Barbers	41,949	82,157	125,542				
	10.4	13.9	15.6	14.0			
Hotelkeepers and Managers	5,725	6,745	11,756	11,826			
Cleaning and Dyeing	2.2	1.7	2.0	1.5	1.9		
Workers, and Pressers...	25,529	30,317	38,800	46,264			1.0
	9.9	7.5	4.8	5.7			
Elevator Tenders							
Servants, Waiters, House-							
keepers, and Stewards	126,879	185,078	244,099	285,182			
	49.3	45.9	41.2	33.0			
Janitors and Sextons	2,767	8,499	23,730	48,544	91,029	149,590	30.6
Laundry Operatives and	1.1	2.1	4.0	6.0	7.4	12.4	15.3
Managers	5,297	13,744	31,831	50,683			
	2.1	3.4	5.4	6.0			
Midwives and Nurses ...		1,189	6,190	12,285		5.2	107,276
		0.3	1.0	1.5			
Porters							
Restaurant and Lunch-							
Room Keepers, Saloon							
Operators, and Bar-							
tenders	50,051	80,880	141,637	199,036	218,024	115,631	125,396
	19.5	20.1	23.9	24.7	17.6	9.8	
Garbage Men							
Other Domestic and Per-		34,986	12,134				
sonal Service Pursuits...		8.7	2.0				
Total	256,850	403,337	592,334	807,015	6.8	76,307	139,049
	100.0	100.1	100.0	100.0		6.3	7.8

TABLE 267

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN DOMESTIC AND PERSONAL SERVICE, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Barbers, Hairdressers, and Manicurists	1,179 0.1	2,902 0.3	2,825 0.2	5,574 0.3	22,298 0.9	33,246 1.4	113,194 3.3
Boarding- and Lodging- house Keepers	7,060 0.7	12,313 1.1	32,508 2.0	59,455 3.0	142,400 5.5	114,740 4.9	127,278 3.7
Hotelkeepers and Managers	865	2,136	5,276	8,533	14,235	14,134	17,310
Cleaning and Dyeing Workers, and Pressers...	0.1	0.2	0.3	0.4	0.5 2,645	0.6 4,573	0.5 21,608
Elevator Tenders .....	.....	.....	.....	.....	25	7,337	12,359
Servants, Waiters, House- keepers, and Stewards...	.....	.....	.....	.....	.....	0.3	0.4
	873,738 91.8	970,273 86.7	1,302,728 80.8	1,430,662 72.6	1,568,680 60.2	1,333,404 57.2	2,103,295 60.6
Janitors and Sextons	153	713 0.1	2,806 0.2	8,033 0.4	21,452 0.8	29,038 1.2	35,820 1.0
Laundry Operatives and Managers	55,609 5.8	108,198 9.7	216,631 13.4	335,232 17.0	507,345 22.9	468,074 20.1	519,006 15.0
Midwives and Nurses	11,356 1.2	14,412 1.3	41,396 2.6	106,601 5.5	193,625 7.4	231,095 12.1	431,879 12.4
Porters .....	.....	.....	.....	.....	73	485	52
Restaurant and Lunch- Room Keepers, Saloon Operators, and Bar- tenders .....	.....	.....	.....	.....	.....	.....	.....
	716 0.1	2,198 0.2	4,837 0.3	7,371 0.4	12,257 0.5	16,276 7	40,008 1.2
Garbage Men .....	.....	.....	.....	.....	.....	6	18
Other Domestic and Per- sonal Service Pursuits...	.....	.....	.....	.....	.....	.....	.....
	616 0.1	5,493 0.5	3,463 0.2	6,964 0.4	31,876 1.2	27,944 1.2	47,184 1.4
Total	951,292 99.9	1,113,633 100.1	1,612,557 100.0	1,970,505 100.0	2,606,911 100.0	2,330,352 99.9	3,469,001 100.1

TABLE 268

WORKERS IN DOMESTIC AND PERSONAL SERVICE: PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	3.133	3.035	3.521	3.655	4.178	3.344	4.281
All gainful workers, male and female...	9.661	8.751	9.698	9.554	10.067	8.494	10.764
[Males of]							
All male gainful workers	2.407	2.736	3.147	3.397	4.106	3.642	4.693
[Females of]							
All female gainful workers	51.805	42.258	41.194	37.045	32.281	27.257	32.263

of the home nursing, it is now customary to employ trained or partially trained nurses. Their proportion of all Domestic and Personal Service increased from 1 per cent in 1870 to 8.6 per cent in 1930.

In comparison with the trend in total population and in that of the total of gainful workers, the Domestic and Personal Service group increased as shown in Table 269.

TABLE 269

PERCENTAGE INCREASE IN TOTAL POPULATION, OF ALL GAINFUL WORKERS, AND OF ALL DOMESTIC AND PERSONAL SERVICE, 1870-1930

Census	Total Population	All Gain- ful Workers	Total Domestic and Personal Service
1870 .....	....	....	....
1880	30.1	39.1	26.0
1890	24.8	30.7	44.9
1900	21.3	27.9	26.0
1910	21.0	31.3	38.3
1920	14.9	9.0	8.0
1930	16.1	17.3	48.7
1930 over 1870	218.4	290.5	335.0

For the whole sixty-year period the category shows considerably more expansion than was experienced by either the total population or the total of gainful workers. In 1870 one domestic or personal servant was required to serve the needs of 32 persons in the population; but by 1930 the public had become so dependent upon personal services of this character that there was one such worker for every 23 inhabitants. However, this development has been paralleled by specialization of personal and domestic services. To cite but a few examples

of this shift: In 1870 there was one general household servant for every 8 families in the United States; by 1930 the situation had altered so that there was only one such servant for every 13 families. On the other hand, there was one barber or hairdresser for every 1,611 persons in the population in 1870 as compared with one for every 328 persons in 1930, also one laundry worker for every 633 persons in 1870 and one for every 196 persons in 1930.

The decentralization of domestic and personal service and its marked specialization has come with the growth of cities, the professionalizing of personal service, the general rise in social outlook which makes the occupation of household servant regarded much less favorably, the competition of industrial employment for women which gives them opportunities outside domestic service at regular hours and often at better pay, the unionizing of some branches of domestic and personal service resulting in higher standards of pay and improved working conditions, and the introduction of a host of domestic and personal "robots" driven by electricity or operated automatically which diminish the necessity for a general servant class. All or most of these forces continue to have an effect upon the situation, increasing the number and variety of personal services being rendered people who seek more personal care and adornment as their standard of living rises.

Sex Composition of the Domestic and Personal Service Group

The following percentage display gives the sex composition of the Domestic and Personal Service group:

Census	Percentage	
	Males	Females
1870	21.3	78.7
1880	26.5	73.5
1890	26.9	73.1
1900	29.1	70.9
1910	32.2	67.8
1920	34.1	65.9
1930	34.0	66.0

Contrary to the usual characteristics of most gainful occupations, namely, the trend toward the inclusion of relatively more female workers, the composition of the Domestic and Personal Service group, which was 78 per cent female in 1870, changed to the point where only 66 per cent were females in

1930. However, both sexes increased in numbers during the sixty years. Personal service is undergoing such changes that proportionately more males find their way into such employment than do females. This is partly accounted for by the shift from the occupation of general domestic servant, who was almost always a woman, to more specialized forms of service in which men have a larger share.

Men have maintained their dominance in the barber business, have increased their proportion in cleaning and dyeing establishments, have become proportionately more of all elevator tenders, have almost exclusively provided the increased supply of porters, and still greatly exceed women in cafés, lunch rooms, and saloons. With the repeal of Prohibition it is likely that the next census will show proportionately more men employed in domestic service than women because of the rapid development of the café and saloon business, in which men predominate.

Barbers, Hairdressers, and Manicurists

The number of barbers, hairdressers, and manicurists in 1930 totaled 374,290, the largest number reported in the period 1870-1930. In fact, the great gain in this group came during the

TABLE 270

BARBERS, HAIRDRESSERS, AND MANICURISTS: PERCENTAGE OF TOTAL
POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

	1870	1880	1890	1900	1910	1920	
Total population ....	.062	.089	.136	.173	.212	.205	.305
All gainful workers, male and female...	.191	.258	.374	.451	.512	.520	.767
[Males of]							
All male gainful workers .....	.213	.284	.437	.529	.575	.553	.686
[Females of]							
All female gainful workers .....	.064	.109	.072	.105	.276	.389	1.052

last ten years principally as a result of drastic changes in the personal habits of women and girls, whose new tastes required much haircutting and -dressing. The result of this marked emphasis on hairdressing was an increase of 73 per cent from 1920 to 1930 in the number of workers in this group.

The change in personal habits of women may be said to have opened up a whole new occupational field for both men and women. The latter found it especially attractive, for the number of women barbers and hairdressers increased 240 per cent from 1920 to 1930, while the number of men engaged in this work increased only 42 per cent. Whether or not the new fashion will last cannot be predicted; but it seems probable that women, having learned the possibilities of greater attractiveness through the cutting and dressing of the hair, will not return to the old practices of long and unmanageable hair dressed by themselves in the home. There is no present reason to suppose that the growing emphasis on hairdressing by specialists will decline and much reason to suppose that it will increase. Undoubtedly the increasing number of women entering employment has had the effect of enlarging the importance of attractive appearance as a business asset. *Fortune* declared (August 1930) that the beauty business of the country amounted to three-quarters of a billion dollars. More than half of this sum was spent by only four million of the forty million women in the United States. With reference to men's barbering *Fortune* stated (May 1937) that shaving is now done at home but that haircutting and other services in barber shops yield receipts amounting to 200 million dollars.

Associated with the trade of "beautician" is the sale of cosmetics, the increase of which bears testimony to the rapid expansion of the trade itself. The value of toilet preparations, perfumery, and cosmetics manufactured in the United States at the beginning of the World War was \$25,000,000. In 1935 there were 554 establishments in the United States engaged in the production of perfume and cosmetics having a value of \$119,446,172.¹

Boarding- and Lodginghouse Keepers

The Census of Business for 1935 received reports from 16,525 rooming houses, boardinghouses (year-round and seasonal), resorts, residential hotels, apartment houses, transient dormitories, and hotels of minimum requirements, having 16,390 active proprietors and 12,916 full-time and part-time employees. It thus appears that these establishments are conducted with few gainful workers.

¹ *Census of Business, 1935, "Distribution of Manufacturers' Sales, Final Report,"* January 21, 1937, Bureau of the Census, p. 2.

Keepers of boarding- and lodginghouses are mostly women, 88 per cent of the 144,371 reported in the census of 1930 being females. This class of workers was .12 per cent of the population, .29 per cent of all gainful workers, and 2.74 per cent of the Domestic and Personal Service group in 1930. The number of boarding- and lodginghouse keepers increased in the successive decades from 1870 until a pronounced high point was reached in 1910, from which there was a decline in 1920 and an upswing in the last decade. Relative to the increase of the total body of gainful workers, their number increased more rapidly until 1910 and declined in the two succeeding decades.

Tourist Camps.—Boardinghouse and lodginghouse keepers complain of the loss of business to tourist camps, and it may be that the decline in gainful workers in these establishments after 1910 is to be charged in part to this competition, to the roadside cottage and the farmhouse accepting lodgers, and to roadside camping. To what extent hotels have been similarly affected can only be surmised.

Only a few cabins were available for tourists prior to 1924, and most of these were shacks. In 1929 a study of 714 auto camps in western Oregon and Washington and in southwestern British Columbia showed that 551, or 77 per cent, were cabin camps, with a total of 5,450 cottages.

The Census of Business of 1935 received reports from 7,814 tourist camps without filling stations and from 2,034 with filling stations. Active proprietors numbered 7,881 for the first group, with 4,153 full-time and part-time employees. For the second group the corresponding figures were 2,130 and 1,659. Adding 1,409 of the 197,568 filling stations reporting an incidental camp business, the whole number of tourist camps reporting in 1935 is 11,257.

From 25 to 35 per cent of all tourist camps are located in California, Texas, Colorado, and Minnesota. California alone reported a total of 1,440 such enterprises. The business of these camps is seasonal, the number of employees in August being double that of January.²

Hotelkeepers and Managers

The number of hotelkeepers and managers reported in the 1930 census was 56,848, approximately 70 per cent of whom

² See Norman S. Haynes, "The Auto Camp as a New Type Hotel," *Sociology and Social Research*, March-April 1931, pp. 365-72.

were men. They were .04 per cent of the total population, .11 per cent of all workers, and 1 per cent of the Domestic and Personal Service group. This relatively small group of workers increased steadily from 1870 to 1910, and diminished in 1920 to a position from which it gained somewhat in 1930. In the 1930 census year, however, the number of hotelkeepers and managers was only 2,051 above the number reported in 1900.

The number of males working in these occupations declined from a maximum of 50,269 in 1910 to the 1930 level of 39,538, a loss of 21 per cent in the twenty years.

TABLE 271
HOTELS CLASSIFIED BY NUMBER OF GUEST ROOMS, 1933*

Number of Rooms	Hotels		Total Number of Guest Rooms	Amount of Receipts	Percentage of Total
	Number	Percentage			
Total	29,462	100.0	1,361,287	\$515,549,000	100.0
500 or more	151	0.5	120,819	119,646,000	23.2
300-499	344	1.2	129,288	80,105,000	15.5
200-299	553	1.9	128,118	67,938,000	13.2
100-199	1,871	6.4	244,969	87,087,000	16.9
50-99	4,133	14.0	272,432	64,887,000	12.6
Less than 50 ...	22,410	76.0	465,661	95,886,000	18.6

* "Services, Amusements and Hotels," *Census of American Business, 1933*, Bureau of the Census, IV, vii.

The hotel business in the United States has become highly concentrated. Large establishments, frequently under chain management, do the greater share of the business. In 1933, hotels with more than 200 guest rooms represented only 3.6 per cent of all such establishments; but they took in 52 per cent of all receipts. At the other extreme were hotels of less than 100 rooms, which comprised 76 per cent of the entire group but accounted for only 18 per cent of all business.

By 1935, 2.3 per cent of hotels operating under chain management accounted for 10 per cent of all the business. The proportion of business done by these chain systems varies considerably from state to state. In New Mexico and Iowa they did in excess of 40 per cent of all hotel business. This business depends upon travelers and tourists; consequently it is not surprising to learn that New York, Illinois, and California report 37 per cent of all hotel business. Nine per cent of all hotels, doing 71 per cent of that business and employing 70

per cent of the workers, are found in cities having over 500,000 population.

The average weekly cash earnings of hotel workers vary with the positions held. In 1933, figures for the nation,³ including only cash payments and omitting tips, bonuses, or living expenses provided as a whole, were as follows:

Hotel executives	\$55
Office clerks	18
Waiters, waitresses	8
Other dining-room, bar, and kitchen help	15
Housekeepers	11
Others	14

These figures are only a crude indication of the earnings of hotel workers. Obviously, the better positions in the large hotels exceed this national average appreciably, making such occupations quite attractive from the standpoint of remuneration. In the small towns, rooming houses and small hotels offer little inducement, either in terms of attractive work or of adequate pay.⁴

Cleaning and Dyeing Workers, and Pressers

The censuses have recorded these occupations separately, beginning with 1910. From 14,860 such workers in 1910, the number in this group increased to 88,118 in 1930. In the latter year such workers were .18 per cent of all gainfully employed and 1.67 per cent of all domestic and personal service workers. In comparison with the trend in development of the national labor force this group has increased more rapidly in each decade, indicating that its services are becoming more important in the national economy. The gains made have been experienced by both sexes; but women working as pressers and in cleaning and dyeing establishments became of consequence only in the last decade, during which their number increased fivefold. Even so, it constituted only 24 per cent of the entire group in 1930.

The census figures on cleaning, dyeing, and pressing workers include owners, managers, foremen, operatives, and laborers in such occupations. How they are segregated cannot be determined. For the most part, however, establishments doing

³ Compiled from *Census of American Business, 1935*, "Hotels," table, p. 32.

⁴ "With the coming of improved economic conditions and the growing habit of living permanently in hotels it is probable that the long-time trend in the American hotel population will be distinctly upward," Norman S. Haynes, *Hotel Life*, University of North Carolina Press, 1936, p. 82.

this type of work are small and are operated under the supervision of an artisan proprietor.

The increasing volume of the cleaning, dyeing, and pressing business is attested by common observation. Mechanical installations and improved chemicals for dyeing and cleaning fabrics have wrought great changes in this industry, especially in the later decades. While the art of dyeing cloth is still very highly skilled, the ordinary operations in cleaning and dyeing establishments have been so subjected to mechanical improvements that many of them have been reduced to the semiskilled level at which female operatives are increasingly employed. The cost of such services has been considerably reduced and its efficiency greatly increased. For these reasons, it is likely that cleaning and dyeing establishments will continue to gain in volume of business, which should result in the employment of additional workers. However, the installation of more automatic and semiautomatic equipment will probably offset this by further degrading skills and opening these occupations increasingly to women, until, in the end, because of the enormously increased productivity of workers, a greater volume of business will probably be handled with proportionately fewer workers.

Elevator Tenders

The number of elevator tenders in 1930 was 67,614, which was .13 per cent of all gainful workers and 1.28 per cent of the Domestic and Personal Service group. Compared with the rate of growth of the national labor force, the number of elevator tenders increased more rapidly from 1910 to 1930, although the difference in rate of increase is not great. Furthermore, the number of elevator tenders is so small that even a substantial increase could not seriously affect the development of the total of gainful workers. While approximately 82 per cent of all such workers are males, females have made remarkable gains since 1910, when only 25 were recorded. By 1930, females in such occupations totaled 12,359. However, they were about the same proportion of all elevator tenders in 1930 as in 1920, both males and females having experienced increases.

Servants, Waiters, Housekeepers, and Stewards (Table 272)

This major group of all Domestic and Personal Service comprised 2,649,167 persons in 1930, of whom about 20 per cent

TABLE 272

SERVANTS, WAITERS, HOUSEKEEPERS, AND STEWARDS: PERCENTAGE OF
TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population	2.595	2.304	2.470	2.258	2.120	1.629	2.158
All gainful workers, male and female...	8.000	6.643	6.804	5.902	5.109	4.137	5.425
[Males of]							
All male gainful workers	1.187	1.255	1.297	1.201	1.267	1.174	1.434
[Females of]							
All female gainful workers	47.582	36.653	33.279	26.896	19.424	15.596	19.562

were men and 80 per cent women. It made up 2.1 per cent of all people in the United States, 5.4 per cent of the total gainful labor force of the nation, and 50.4 per cent of all domestic and personal service workers.

In 1870 there was one member of this group for every 38 inhabitants; by 1930 there was one for every 47 persons in the country, indicating that relatively less use is being made of this type of service than formerly. Several interrelated factors have brought about these sweeping changes. In the final decades of the last century and the first of the present one immigration was extensive. Quite frequently the immigrants did not speak the English language, which handicapped them, or more particularly the females among them, in their search for employment. They were unskilled, and the factory system which could make use of unskilled or little-skilled female machine operators had not yet become widespread. Homes in those days had few labor-saving or power-driven appliances and lacked many modern conveniences of construction such as sanitary plumbing and heating. The larger homes consequently required much domestic labor, which could be secured at relatively low wages from among newly arrived immigrant women. Girls leaving backwoods farms for the bright lights and better pay of city jobs also added to the growing list of available female domestic servants.

After 1900, however, new arrivals in the United States from Europe found a well-developed and rapidly expanding factory system waiting for unskilled or semiskilled women operatives who were willing to work for the wages offered, which though low seemed quite attractive to these immigrants, as well as to

the farm folk who continued to flock to the cities in increasing numbers. The number seeking service as servants, waiters, etc., while increasing, did not maintain itself in proportion to the increase in population. Nor did this class of domestic and personal servant maintain its position in the national labor force; for in 1870 it was 8 per cent of all workers and it declined in decennial reports thereafter until it reached its low point of 4.1 per cent in the war period culminating in the census of 1920. In the 1930 decade it had recovered to 5.4 per cent of all workers, which placed workers in this category at about the same proportion of all workers that they were in 1910 but somewhat below their proportion of the nation's workers in any decade since 1870.

The years 1870-1900 show a continuous decennial gain in number of workers in this category, whereas thereafter the course was erratic, a gain being noted in 1910, followed by a very sharp reduction in 1920, and a remarkable recovery in 1930, accounting for the reported gain in the entire thirty-year period. Since the group under review is made up of a variety of occupations, it will be well to show here the breakdown for the group, as reported in the Census of Occupations for the years 1910, 1920, and 1930, only.

TABLE 273

CLASSIFICATION OF SERVANTS, WAITERS, HOUSEKEEPERS, AND STEWARDS,
1910-1930*

Group	1910	1920	1930
Housekeepers* and Stewards	189,273	221,612	256,746
Hotels, Restaurants, Boardinghouses, etc. ....	.....	.....	30,626
Other Housekeepers and Stewards...	.....	.....	226,120
Servants			
Cooks	450,440	398,475	565,392
Hotels, Restaurants, Boarding- houses, etc. ....	.....	.....	243,670
Other Cooks .....	.....	.....	321,722
Other servants ^b	1,121,785	872,471	1,433,741
Hotels, Restaurants, Boarding- houses, etc. ....	.....	.....	193,655
Other Domestic and Personal Services .....	.....	.....	1,240,086

* *Fifteenth Census of the United States, 1930, "Population,"* IV, 16.

^a It was sometimes impossible from the enumerators' returns to distinguish between paid housekeepers and housewives in their own homes.

^b Other servants were listed in 1910 and 1920 as bellboys, butlers, chambermaids, coachmen and footmen, ladies' maids, valets, etc., nursemaids, and other servants.

House Servants.—A survey of the servant problem was made by *Fortune* (October 1937 and March 1938) the data of which were derived from 17,000 *Fortune* subscribers, 3,000 members of women's clubs, and 500 editors of women's magazines. Certain of the findings are briefly reported below. Seventy per cent of the people today who have no servants spent their childhood in a household that employed one or more. In general, persons who had servants in childhood but do not have them now far exceed those who have them now but did not have them in childhood. Labor-saving devices for the home, an apparent inability to stabilize hours, opportunities for government work, and an increasing aversion on the part of American-born white women to work as servants in other women's homes probably account for a large share of this decline in the use of house servants. It is stated that despite the business recovery of 1934 the domestic situation has grown worse for reasons that are peculiar to it and have less to do with business prosperity than is generally supposed.

The use of house servants by the American people (reported in 1937) is shown in the percentage figures⁵ below:

Status	Total	Pros- perous	Upper Middle Class	Lower Middle Class	Poor	Negroes
Full-time	10.4	50.9	15.1	3.6	2.1	
Part-time	13.6	19.4	26.7	10.2	3.9	1.2
Relative helps with work	3.3	2.6	2.7	2.5	2.0	11.2
None	72.7	27.1	55.5	83.7	92.0	87.6

Money wages for general houseworkers (reported in 1938)⁶ were as follows:

Wage Group	Percentage of Employment Type Indicated				
	All General House- workers	Cooks	Wait-	Nurses	Chamber- maids
Under \$30 ..	26	18	6	14	10
\$30-\$40	24	17	10	11	14
\$40-\$50	26	18	15	13	18
\$50-\$60	11	11	15	10	12
\$60-\$75	10	19	34	20	30
\$75 and over	3	17	20	32	16

⁵ *Fortune*, October 1937, p. 176.

⁶ *Ibid.*, March 1938, p. 83.

As to hours of daily work it was reported that 5 out of 6 worked more than 8 hours, 2 out of 6 worked more than 10 hours, and 1 out of 6 worked more than 12 hours.

Forty per cent of the respondents named long hours and 9 per cent named low wages as a cause of discontent. Nearly half the total number of servants were Negroes. Only a small percentage of homes made adequate provision for baths, visitors, and insurance against illness.

The future of domestic house service is affected by two trends, both tending toward its reduction. One is the long-run tendency to turn over to low-cost, domestic-service industries many of the traditional functions of the home, the other that to bring into the home modern labor-saving appliances.

The production of the latter has had an enormous expansion in recent years and is said to have an almost unlimited future. It is reported that of the 21 million wired houses in 1936, 97 per cent had electric irons, over 40 per cent washing-machines, and over a third, refrigerators—to mention only three of the modern mechanical aids of the home keeper.

The future of both these tendencies will depend much upon the broadening of the distribution of electrical power, the lowering of power rates, and the cheapening of appliances. If these are achieved, the demand for house servants may be expected to diminish—barring a marked improvement in purchasing power.

Waiters and Waitresses.—Waiters and waitresses are employed in eating establishments of various kinds. The number of such establishments in 1929 was 134,000—about one to every 900 inhabitants, classified⁷ as follows:

Type	Number
Restaurants with table service (including tearooms) . . .	36,000
Lunch rooms	58,000
Lunch counters (including sandwich shops)	17,000
Soft-drink stands	10,400
Refreshment stands	7,700
Cafeterias (including automats)	3,000
Fountain lunches	2,000
Box lunches	160

These eating places employed some 420,000 full-time and 58,000 part-time workers during the year.⁸ The proportion of

⁷ "Restaurant Occupations," *Occupations: A Series of Vocational Studies*, NYA of Illinois, Research Report No. 1, revised, September 15, 1938, p. 4.

⁸ *Census of Retail Distribution, 1930*, Vol. 1, Part 1, pp. 48, 56.

men and women was 55 and 45 per cent, respectively, for full-time and 46 and 54 per cent for part-time workers.

In 1933 the total number of such establishments rose to 170,000; of these, 166,600 were independent, 3,400 were chains, and 500 were of other classification.⁹ Later figures by the National Restaurant Association (1936) report 150,000 eating places in the United States employing 225,000 cooks, 200,000 waitresses, and 50,000 waiters.¹⁰

In general the prospects of the industry employing waiters and waitresses are good. Industrial trends are concentrating people in urban centers where economic conditions do not favor early marriage and the setting up of homes. Added to the unmarried are many married couples living in small apartments who eat one or more meals a day away from home. Small families are now the rule, with many wives at work. A favorite form of recreation today is eating out. All these conditions favor the expansion of commercial eating places. There is at the present time about one restaurant to 800 persons—certainly not a high figure. Improvement in purchasing power would undoubtedly increase the demand for waiters and waitresses.

Janitors and Sextons

The number of janitors and sextons was 309,625 in 1930, which was .63 per cent of all workers, 6 per cent of all domestic and personal service workers. These workers have experienced a remarkable numerical growth in the decades since the recorded number of less than 3,000 in 1870, which in some measure reflects the development of cities and the use of large buildings requiring janitor service. Most of this development has come since the turn of the century. The gain in the thirty years from 1870 to 1900 was 53,657, but from 1900 to 1930 the number of new janitors and sextons was 253,048.

In comparison with the decennial growth in the number of persons in the total population, of the total of gainful workers, and of all domestic and personal service workers, the number of janitors increased at a more rapid rate in the successive decades after 1870. This is true despite the recognized increased productivity per worker, resulting from the more sanitary construction of buildings which lessens cleaning, the

⁹ *Statistical Abstract of the United States*, 1935, p. 780.

¹⁰ *National Restaurant Association Year Book*, Chicago, October 1936.

unified and automatic heating systems installed, and the specialization of janitor service to secure greater efficiency. It is probable that the indicated trends will continue, with more janitors reported as public and private buildings requiring special custodian or janitor care are built.

Laundry Operatives and Managers

The labor force engaged in laundry work totaled 626,282 in 1930, which was .5 per cent of all people in the United States, 1.3 per cent of all gainful workers, and 12 per cent of all do-

TABLE 274

LAUNDRY OPERATIVES AND MANAGERS:* PERCENTAGE OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
All gainful workers, male and female ..	.487	.701	1.093	1.328	1.740	1.276	1.283
[Males of]							
All male gainful workers .....	.050	.093	.169	.213	.222	.191	.282
[Females of]							
All female gainful workers	3.028	4.087	5.534	6.303	7.396	5.474	4.827

* Comprising: launderers and laundresses (not in laundry); laundry owners, managers, and officials; laundry operators; deliverymen; foremen and overseers; and laborers and other operators.

mestic and personal service workers. The number of laundry operatives and managers increased in the decades from 1870 to 1910, then dropped perceptibly during the war years as recorded in 1920, and recovered appreciably in 1930 but failed to reach the 1910 level.

This does not mean that the volume of such work has diminished since 1910. On the contrary, the practice of sending out the family washing; the increase in population, particularly of that part living in cities where facilities are lacking for domestic care of the laundry; the concentration of laundries into larger plants using labor-saving machinery, which has made the work more efficient and less costly—all have combined to enlarge appreciably the amount of work done by commercial establishments. The greatly increased volume of business has been most noticeable in the years since 1920; but, despite this fact, there were 37,722 fewer laundry workers

listed in 1930 than in 1910. In a large measure this bears evidence of the introduction of labor-saving machinery which permits a much greater volume of work with no comparable increase in the number of workers required. While hand laundries in 1935 were nearly three times as numerous (17,000) as power laundries (6,000), they employed only one-sixteenth as many helpers. Their receipts in this year were 10 per cent of all receipts, as compared with 90 per cent for the power laundries.¹¹

However, no analysis of the trends in laundry workers is safe without certain details furnished in Table 275.

TABLE 275

DISTRIBUTION OF LAUNDRY WORKERS, MALE AND FEMALE, LISTED IN DOMESTIC AND PERSONAL SERVICE, 1910-1930*

Group	Number		
	1910	1920	1930
Launderers and Laundresses (not in laundry)	533,697	396,756	361,033
Laundry Owners, Managers, and Officials...	18,043	13,692	24,545
Owners and Proprietors.....	15,441	9,027	15,440
Managers and Officials.....	2,602	4,665	9,105
Laundry Operatives	112,264	120,715	240,704
Deliverymen			20,573
Foremen and Overseers.....	3,071	3,611	6,337
Laborers	8,786	13,107	19,293
Other Operatives	100,407	103,997	194,501
 Total Laundry Managers, Operatives, and Laundresses	 664,004	 531,163	 626,282

* Some owners of hand laundries probably are included with laundry operatives. Some deliverymen probably were returned and classified as chauffeurs. "Deliverymen, Laundries" were included in 1920 and in 1910 in the group "Deliverymen, Bakeries and Laundries" in "Trade," *Fifteenth Census of the United States, 1930*, "Population," IV, 16.

It is apparent that the decline in number of laundry operatives and managers is due almost entirely to the decrease in number of launderers and laundresses working in homes. The census notes a classification difficulty in this connection, indicating that it is not always possible to distinguish between laundresses reported as working in hotels, in homes, and in laundries.¹² It is presumed that these improper classifications do not constitute an error of sufficient magnitude to invalidate the series in question.

¹¹ "Laundry Occupations," *Occupations: A Series of Vocational Studies*, NYA of Illinois, Research Report No. 4, revised, March 9, 1937, p. 5.

¹² *Fifteenth Census of the United States, 1930*, "Population," V, 9.

A diminishing number of power laundries between 1929 and 1935, associated with a decrease in the number of their wage earners, as well as of total receipts (not compensated for by commensurate increases in hand laundries),¹³ suggests a trend toward the increasing use of power machinery in the home for laundry purposes. Just what this portends for laundry workers is not clear. Eighty dollars a year per laundry customer is the "accepted average" with the trade in 1935, or three dollars per person for the United States in commercial laundry service.¹⁴ Evidently much laundry is still done in the home or by the traditional washerwomen. While new purchasing power might increase these figures substantially, some part of it would undoubtedly go into an additional use of home mechanical appliances.

Midwives and Nurses

The 1930 census lists the number of midwives and nurses as 451,198, which was .36 per cent of the entire population, .92 per cent of the total of gainful workers, and 8.6 per cent of all

TABLE 276

MIDWIVES AND NURSES : * PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population ....	.032	.031	.076	.159	.234	.289	.367
All gainful workers, male and female...	.097	.090	.209	.416	.564	.735	.924
[Males of]							
All male gainful workers .....	.008	.008	.033	.052	.072	.075	.051
[Females of]							
All female gainful workers .....	.618	.544	1.057	2.043	2.397	3.287	4.016

* Trained Nurses subtracted from Professional Service group and included with Midwives and Nurses (not trained) 1910, 1920, and 1930.

domestic and personal service workers. Their number increased decennially after 1870, with the largest gains after 1900.

In 1910 the census separated professionally trained nurses from this group and placed them in Professional Service, from which category they have been taken in this treatise and placed

¹³ *Census of Manufactures, 1935*, "Power Laundries," and *Census of Business, 1935*.

¹⁴ "Home Washers vs. Laundries," *Business Week*, December 1932.

back in the group "Midwives and Nurses" so that a continuous series could be secured, since in the decades 1870 to 1910 it was impossible to separate practical nurses and nurses who had professional training. The proportion of the group who were midwives and the proportion who were nurses in the 1910-1930 decades is shown in Table 277.

TABLE 277
MIDWIVES AND NURSES IN THE UNITED STATES, 1910-1930*

Group	1910		1920		1930	
	Number	Percent- age	Number	Percent- age	Number	Percent- age
Trained Nurses	82,327	38.2	149,128	48.7	294,189	65.2
Nurses—Not Trained	126,838	58.9	151,996	49.7	153,443	34.0
Midwives	6,205	2.9	4,773	1.6	3,566	.8
Total	215,370	100.0	305,897	100.0	451,198	100.0

* Census data on nurses and midwives are somewhat inaccurate. It was sometimes impossible for the census enumerators to distinguish between trained and untrained persons. Also it was not always possible to segregate nursemaids from nurses, and even household servants sometimes gave their status as nurses. *Fifteenth Census of the United States, 1930, IV, 15-16.*

Over 95 per cent of all midwives and nurses in 1930 were women. The number of male nurses reached its maximum in 1920, and had declined markedly by 1930. On the other hand, the number of females in such service continued to increase in successive decades.

How much of the great increase in number of nurses recorded by the census in 1910 as compared with 1900 is due to the inclusion of nursemaids and others who should not be listed in this classification cannot be determined; but that improper census enumeration accounts for a considerable part of the trend is readily acknowledged by the census authorities. Nevertheless, the profession of nursing has expanded greatly in the past twenty years. Fifty years ago there was no recognized profession of trained nurse, such workers being listed among domestic and personal servants. Today, trained nurses comprise the second largest group among professional occupations in which women engage, being exceeded only by school teachers.

Nursing has appealed to ambitious girls as a profession which could be learned without substantial outlay of money or a prolonged period of training. Many hospitals offered courses in nursing partly as a means of securing cheap helpers.¹⁵ This

¹⁵ "The Trained Nurse and the Depression," *Nation*, October 11, 1933, pp. 406-7.

method of training was available to an increasing number of high-school graduates in the years from 1910 to 1920. But as the market became flooded with mediocre nurses the inadequacy of the training program as a means of preparing girls for professional work was recognized and a change took place. In the more progressive states courses for nurses in recognized colleges and universities, where the work is done in connection with medical schools, are being substituted for hospital training for nurses. The examination for "registered nurse" is being made more difficult and the occupation placed on a professional level. The work of the nurse is being lifted out of the level of domestic service, an eight-hour basis is being established, and associations are being formed to standardize both the conditions of service and the pay.

Despite these efforts, however, the number of trained nurses has advanced quite out of proportion to the increase in population. Since 1900, while the population increased 62 per cent, the number of trained nurses advanced 2,374 per cent. The census of 1930 disclosed that there was one trained nurse for every 417 persons in the country. It was the observation of qualified experts that, as a result of the mass methods employed in training and certifying nurses prior to the depression, there were too many trained nurses for the number of jobs available. That there are too many well-qualified nurses is doubtful; but the only way to insure their steady employment is to make it possible to distinguish between them and the mediocre ones who crowd the employment agencies. Compulsory licensing systems and higher standards are urged as the only way in which to change conditions sufficiently so that the profession will be rescued from the confusion into which it has been thrown. The relatively high cost of professional nursing service has recently encouraged the idea of a secondary qualified grade of nursing service for less exacting cases.

Porters

Porters other than those employed in stores are listed separately in the censuses of 1910-1930. Their number in 1930 was 127,488, a decided increase over previous censuses. They were .26 per cent of all workers and 2.4 per cent of the total number of persons in domestic and personal service. The proportion of Porters has remained fairly constant in relation to Domestic and Personal Service and in relation to the na-

tional labor force as a whole. There is some prospect of reduction in the number of railroad porters, along with the decrease in number and size of passenger trains; nevertheless, because of the increased services rendered by porters in passenger transportation, little can be said concerning the future need for porters.

Restaurant and Lunch-Room Keepers, Saloon Operators, and Bartenders

The number of such workers totaled 165,406 in 1930, which was .13 per cent of the entire population, .33 per cent of all workers, and 3.1 per cent of all domestic and personal service workers. Their number increased from 1870 to 1910, but decreased in 1920 and 1930. This recent trend is largely the result of Prohibition and its effect upon bartenders, saloonkeepers, and cafe operators. A detailed analysis of this condition is given in Table 278.

TABLE 278

RESTAURANT, CAFE, AND LUNCH-ROOM KEEPERS, SALOON OPERATORS, AND BARTENDERS, 1900-1930

Occupation	1900	1910	1920	1930
Restaurant, cafe, and lunch-room keepers	33,844	60,832	87,987	165,406
Bartenders	88,817	101,234	26,085	....
Saloon operators	83,784	68,215	17,835	....
Total	206,407	230,281	131,907	165,406

This table gives striking evidence of the effect that change in public policy has upon occupations. The number of saloon operators and bartenders was increasing until the Prohibition Amendment was passed. That act immediately displaced two-thirds of them and considerably altered the employment of the other third. By 1930 no persons were listed in either occupation.

As was noted above in the discussion of waiters and waitresses (page 573) the number of restaurant and lunch-room operators has increased rapidly in decades of this century, largely by reason of a multiplication of roadside stands and eating houses. This form of business reflects the growth of cities and the greater dependence of the population on meals served in public eating places. How rapid this increase in number of restaurant operators has been in proportion to the increase in population is indicated by the fact that the former

have increased 359 per cent since 1900 while the latter have advanced only 62 per cent.

Garbage Men

Garbage men are listed separately in the census since 1910, and for the purpose of this study have been removed from the group of Public Service and placed in that of Domestic and Personal Service, where, in terms of occupational function, they seem to belong. In 1930 the number of garbage men was 9,163, a substantial gain over this number in previous decades. They are a very small group, only .02 per cent of all gainful workers and .17 per cent of all persons in domestic and personal service. Though this increase should continue, the number in such work can have little appreciable effect upon the development of the national labor force.

Other Domestic and Personal Service Pursuits

The great variety of occupations such as boothblacks, charwomen, and common labor used in domestic and personal service in 1930 totaled 186,233. This was .15 per cent of all gainful workers and 3.5 per cent of those in domestic and personal service. Most of the changes in the statistics for the several decades are due to census reclassifications, in which this group has served somewhat as a catch-all, so that little can be said of the trends which will indicate what is happening with respect to "other pursuits" in Domestic and Personal Service.

Certain details concerning these other pursuits, obscured by the general tables, may be found in Table 279.

TABLE 279

OTHER PURSUITS IN DOMESTIC AND PERSONAL SERVICE, 1910-1930

Group	1910	1920	1930
Boothblacks	14,020	15,175	18,784
Charwomen and Cleaners.....	34,034	36,803	61,932
Laborers	53,480	32,893	71,687
Bathhouse Keepers and Attendants.	4,595	2,858	.....
Cemetery Keepers	4,842	5,540	9,762
Hunters, Trappers, Guides.....	3,887	7,332	6,219
Umbrella Menders, etc.	1,053	917	.....
Other Occupations	433	2,733	17,849
Totals	116,344	104,251	186,233

The groups that show an increasing trend are cemetery keepers, hunters, trappers, and guides; bathhouse keepers and umbrella menders are declining in number.

CHAPTER XI

TRENDS IN CLERICAL OCCUPATIONS

General Characteristics (Tables 280 to 284)

The occupations which the census has grouped under the caption "Clerical" vary greatly in the character of the work performed. Some of these clerical occupations border on busi-

TABLE 280

NUMBER AND PERCENTAGE DISTRIBUTION OF GAINFUL WORKERS, MALE AND FEMALE, IN CLERICAL OCCUPATIONS, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Bookkeepers, Cashiers, and Accountants	{ 61,740 19.8	105,575 19.9	159,374 19.2	254,880 22.5	436,700 29.8	734,688 24.9	930,648 24.3
Clerks (except in stores)*..	{ 241,432 77.4	396,810 74.7	586,164 70.6	696,338 61.8	720,498 44.2	1,487,905 50.4	1,997,000 52.2
Messengers, Errand and Office Boys and Girls	{ 8,717 2.8	13,985 2.6	51,355 6.2	71,622 6.3	108,085 6.6	113,022 3.8	90,379 2.4
Stenographers and Typists	{	14,713 2.8	33,418 4.0	112,364 9.9	316,693 19.4	615,154 20.8	811,190 21.2
Total	{ 311,889 100.0	531,083 100.0	830,311 100.0	1,135,204 100.0	1,631,926 100.0	2,950,769 99.9	3,829,217 100.1

* Owing to census classification difficulties, figures for each decade prior to 1910 include some clerks in stores as well as general clerks. For that reason the series is closely comparable only from 1910 to 1930.

TABLE 281

NUMBER AND PERCENTAGE DISTRIBUTION OF MALE GAINFUL WORKERS
IN CLERICAL OCCUPATIONS, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Bookkeepers, Cashiers, and Accountants	{ 59,774 19.7	98,141 19.6	131,602 18.6	180,727 20.9	299,545 28.6	375,564 24.4	447,937 24.1
Clerks (except in stores) ...	{ 235,177 77.5	379,062 75.8	515,407 72.8	590,925 68.5	597,833 57.1	1,015,742 65.9	1,290,447 69.5
Messengers, Errand and Office Boys	{ 8,637 2.8	13,585 2.7	48,446 6.8	64,959 7.5	96,748 9.2	98,768 6.4	81,430 4.4
Stenographers and Typists	{	9,008 1.8	12,148 1.7	26,246 3.0	53,378 5.1	50,410 3.3	36,050 1.9
Total	{ 303,588 100.0	499,796 99.9	707,903 99.9	862,857 99.9	1,047,504 100.0	1,540,484 100.0	1,855,864 99.9

TABLE 282

NUMBER AND PERCENTAGE DISTRIBUTION OF FEMALE GAINFUL WORKERS
IN CLERICAL OCCUPATIONS, 1870-1930

Group	1870	1880	1890	1900	1910	1920	1930
Bookkeepers, Cashiers, and Accountants	{ 1,966 23.7	7,434 23.8	27,772 22.6	74,153 27.2	187,155 32.0	359,124 25.5	482,711 24.5
Clerks (except in stores) ...	{ 6,255 75.4	17,748 56.7	70,757 57.7	105,413 38.7	122,665 21.0	472,163 33.5	706,553 35.8
Messengers, Errand and Office Girls	{ 80 1.0	400 1.3	2,909 2.4	6,663 2.4	11,287 1.9	14,254 1.0	8,949 .5
Stenographers and Typists	{	5,705 18.2	21,270 17.3	86,118 31.6	263,315 45.1	564,744 40.0	775,140 39.3
Total	{ 8,301 100.1	31,287 100.0	122,708 100.0	272,347 99.9	584,422 100.0	1,410,285 100.0	1,973,353 100.1

TABLE 283

CLERICAL WORKERS: PERCENTAGE OF TOTAL POPULATION, AND OF ALL
GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population ....	.809	1.059	1.326	1.494	1.774	2.791	3.119
All gainful workers, male and female ..	2.494	3.054	3.652	3.905	4.276	7.091	7.842
[Males of] All male gainful workers	2.845	3.390	3.760	3.632	3.481	4.659	4.874
[Females of] All female gainful workers .....	.452	1.182	3.135	5.120	7.237	16.496	18.353

ness management; others represent tasks primarily concerned with manual routine. The range of these occupations is suggested by the following titles: Bookkeepers; Cashiers; Accountants; Office and Business Clerks (not including clerks in stores who serve customers); Shipping Clerks; Messengers; Office Boys and Girls; Bundle, Cash, and Errand Boys and Girls; Stenographers and Typists. These diverse occupations have an element in common in that they are directly related to the management of industry and trade without having final responsibility for its operations.

The Clerical group is a major occupational category. In 1930 it comprised 3,829,217 gainfully employed persons and was fifth in size among the ten major census categories. From an occupational group which engaged the attention of 4.3 per

cent of the entire labor force in 1910, the group of clerical workers had grown to 7.8 per cent of all workers in 1930.

How rapid the expansion of this category of workers has been can be seen in Table 284.

TABLE 284

PERCENTAGE GAIN OF CLERICAL WORKERS IN COMPARISON WITH THAT OF THE TOTAL GAINFULLY EMPLOYED AND OF THE TOTAL POPULATION, 1910-1930

Census	Total Population	Total Gainfully Employed	Clerical Workers
1910 .....	....	....	....
1920	14.9	9.0	80.8
1930	16.1	17.3	29.7
1930 over 1910.....	33.5	27.9	134.6

The Clerical group was numerically of minor importance in the United States prior to and immediately following the Civil War; but with the great shift from an agricultural to an industrial economy in which the factory system and urban business became predominant, the number of clerical workers increased rapidly after 1870.

In the twenty years following 1910 the gain amounted to 3.5 per cent of the total labor force and clerical workers multiplied in actual number 2.3 times. Even during the ten years from 1920 to 1930, the number of clerical workers increased by nearly a third, an addition of almost a million workers.

The expansion of business during the decade of the World War undoubtedly explains the noteworthy increase from 1910 to 1920 in the proportion of gainful workers who were in clerical occupations. It was during this period that many of the barriers against the employment of women were broken down, as is evidenced by the exceptional increase in the number of women clerical workers after 1910. That fewer new clerical workers were added in 1930 as compared with the number added in 1920 probably was because of the return to more normal peacetime conditions.

Whether or not the remarkable trends just noted will be maintained cannot be predicted until certain underlying causes have been adequately analyzed. C. Hartley Grattan, in an excellent summary of occupational trends, quotes an authority on labor as saying that the modern age in America is characterized by mechanization, standardization, systematization, specialization, electrification, power expansion, speed, scien-

tific research, chemical discoveries, inventions, consolidations, and giant chain institutions.¹ Clerical labor is affected by what occurs along all these lines. How it has been affected may be indicated by a series of illustrations.

The physical volume of production in the United States has been increasing much faster than the number of workers engaged in that production. From 1899 to 1929 agricultural production increased 48 per cent in volume, while the number of persons engaged in that production increased only 1.1 per cent. Manufacturing production increased 210 per cent in that period of time, while the labor force used in manufacturing and mechanical occupations increased only 50 per cent.² It was during these years that the marked shift in population occurred which has made the United States primarily a nation of city dwellers. The expansion of urban population and the diminishing need for workers occurred simultaneously with the growth of a productive mechanism which became so efficient that it could turn out a much greater supply of commodities than could be sold easily.

To create a demand for new goods and to keep manufacturing plants busy, a greatly expanded sales and clerical force became essential. The lack of opportunities in productive industries swelled the ranks of new workers seeking clerical employment and by the pressure of their numbers made available a quantity of comparatively cheap labor at just the time when the business structure could make use of great numbers of additional clerical workers.³

The greatly augmented production of agricultural and manufactured goods required a market. Modern advertising, promotion, and salesmanship emerged to meet the need. Where sufficient purchasing power did not exist to make cash sales possible, the financial structure was modified to allow part-payment sales. The various schemes to move goods by credit has resulted in installment buying accounting for 13 per cent of the forty-nine billion dollars' worth of purchases made in 1929.⁴ Consignment and time-payment sales from wholesale

¹ C. Hartley Grattan, "Back to Work, When and Where?" *Harper's Monthly Magazine*, January 1937, p. 158.

² F. G. Tryon and Margaret Schoenfeld, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 61.

³ Paul Douglas, *Real Wages in the United States, 1890-1926*, Houghton Mifflin Company, New York, 1930.

⁴ "Installment Selling: The Real Situation—a Special Report to Executives," *Business Week*, November 13, 1937, table on p. 50.

houses to retail merchants have likewise advanced to the place where they dominate the wholesale trade. All these practices require an increased clerical force.

Another important reason why more clerical workers were needed is the drastic change in the form of industrial ownership and control. At the beginning of the nineteenth century there were only 225 corporations in the United States and only 18 of these were manufacturing and mercantile corporations.⁵ Corporate development was very slow until long after the Civil War. Following the turn of the century, however, the corporate form of business enterprise grew at such a pace that, by 1927, 97 per cent of the total value of manufactured products was coming from incorporated establishments and over 50 per cent of the value of mercantile business was being done by them.⁶

Even local retail business has been invaded by the corporations; grocery chain stores, which were almost unknown twenty years ago, now do a business estimated at a third of the grocery sales of the nation and a half of the volume of such business done in cities.⁷ Five corporations buy and distribute one-third of the commercial milk supply of the nation.⁸

Within the group of 392,021 corporations which do such a great proportion of all American business are 618 with assets of over fifty millions of dollars each. They do more than 60 per cent of all corporate business. These few gigantic business institutions, stretching over the length and breadth of the country, have multiple outlets and varied operations, all of which increase the need for clerical service.

The tendency toward mergers and control by strongly entrenched capital groups causes competent observers to suggest that single proprietorships are doomed to extinction in more and more fields, so that by the middle of the century, if the present trend continues, almost all American business will be corporate in form and the greater part of all business within these large units will be controlled and managed by a very few dominant corporations.⁹ This development will have a marked

⁵ National Industrial Conference Board, "Taxation of Business Corporations," New York, 1931, p. 11.

⁶ H. Dewey Anderson, *Our California State Taxes*, Stanford University Press, 1937, p. 230.

⁷ Harry W. Laidler, *Concentration of Control in American Industry*, Thomas Y. Crowell Company, New York, 1931, pp. 5, 366-69.

⁸ "Facts to Farmers," *Farm Research*, November 1937.

⁹ A. A. Berle and Gardiner Means, *The Modern Corporation and Private Property*, The Macmillan Company, New York, 1933, pp. 17-46.

effect upon the number of clerical workers needed. In some instances such mergers will eliminate workers; but every new handling of goods calls for new bookkeeping and an additional amount of paper work required of clerks.

Whether or not even this extended business will use an ever growing number of clerical workers depends somewhat on technological changes which are taking place in accounting, office management, office-plant communication, and the like. The fact remains that the changes in industry just noted have called for a greatly increased number of clerical workers despite the rapid advance in the productivity of such workers. This increase is caused, in part at least, by the added number of operations in which clerical workers are needed and the increase in the number of establishments which can profitably make use of clerical workers. Such labor is relatively cheap, and as the margin of profit is cut down by competition cost accounting and accurate records of transactions become of more importance, not only to the large-scale business whose corporate character demands permanent records but even to small independent businessmen.

Public policy also affects the amount of clerical work required of business, and probably increases greatly the number of clerical workers used in industry. Business taxes, such as income and sales taxes, which were of negligible importance sixty years ago, have become major forms of national, state, and local taxation. These tax laws require business firms to keep accurate, permanent records, which are subject to government inspection and audit. The introduction of social-service reforms requires personnel records and multiplies many fold the number of clerks and typists engaged in the operation of social-security laws. In the United States such social reforms are only in their inception; they indicate a growing field for clerical labor.

The effect upon clerical workers of the increasing power of unions cannot now be foretold. The great expansion of clerical occupations has occurred without either the help or the hindrance of unionism. If unionism results in limiting hours, raising wages, and establishing higher standards of entrance into the ranks of clerical workers, then it may be expected to retard somewhat their numerical increase, although it may appreciably improve the conditions of those employed. The influence of unions in these directions, however, may be affected

by the rapid mechanization of clerical operations, which tends to lower the requirements and cheapen the price of that labor. What the ultimate effect will be cannot be forecast, because the full weight of either of these forces has not yet been felt.

The skills required of clerical workers are such that they can be readily learned and performed by women, who now fill over half of all clerical positions. Female labor, by and large, is considerably less expensive than male labor. This fact in itself has greatly accelerated the growth in number of clerical workers.

Coincident with the rapid expansion of manufacturing and trade came a series of labor-saving inventions which drastically altered office practice and business management, thereby greatly increasing the clerical force available for jobs. For example, the typewriter, which was invented in 1714, did not reach a stage where it was manufactured for sale until 1873. Even then, it was such a crude instrument that its acceptance was extremely slow. Only after the touch system was introduced in 1890 did the commercial possibilities of the typewriter begin to be realized. At the turn of the century the public schools, looking about anxiously for some vocational subject that could be taught in the classrooms, spied the typewriter. During the next ten to twenty years so many typists were turned out, that despite the widespread demand for them, the number was sufficient to flood the market and keep this class of workers from sharing in the real wage increase of the first quarter of this century.¹⁰

Several of the more important inventions which have resulted in additional clerical service in business have had similar histories. Most of such inventions reached practical use toward the end of the last century, some being introduced during the first quarter of this century. The principal inventions are as follows: typewriter, mimeograph, calculator, Ediphone, bookkeeping machine, cash register, adding machine, Hollerith machine, stenotype, loose-leaf office books, switchboard, automatic telephone, modern filing systems, addressograph, mailing machine.

Efficiency experts now plot office space to economize the time of the working force, especially of the more expensive executive personnel, and such procedure frequently results in

¹⁰ Paul Douglas, *Real Wages in the United States, 1890-1926*, Houghton-Mifflin Company, New York, 1930, pp. 366-68.

the use of more cheap labor of a clerical character. In large establishments stenographic "pools" are being introduced to do away with individual private secretaries, and this system reduces the number of typists required. But even with these economies there is a definite limit to the amount of work which can be done by any given number of persons, and beyond this point reductions in staff cannot be made.

Some idea of the extent to which the installation of machines has affected office work may be gained from a survey of 94 representative business firms in Philadelphia and St. Louis made by the Women's Bureau of the United States Department of Labor.¹¹ Of 438 women workers employed by these firms, formerly on bookkeeping and billing work, only 40 per cent were still doing this work by hand.

From a negligible quantity of office machines produced in 1900, commercial acceptance grew to the point where, in 1929, representative types of office machinery were placed on the market in the following quantities:

Typewriters	959,627
Adding machines	157,740
Calculating machines	57,201
Check-writing machines	63,576

In 1929, sales of addressing and mailing machines for office use reached \$10,537,000 and that of mimeograph and multigraph machines \$3,489,000.¹²

The automatic telephone has been introduced into offices and factories particularly since 1920, and electrical signaling and conveying devices have made rapid automatic or semi-automatic communication possible, with the result that in some instances a reduction in messengers has been effected; in other instances communication systems have been installed which require new workers.

Despite all these new mechanical and management techniques, the over-all trend shows a greatly increased clerical labor force.

As to the future, with the increased rate of growth in man-hour productivity in industry, and with every prospect for production to multiply at even a faster tempo, there is the

¹¹ Mary Anderson, "The Clerical Worker and Industrial Change," *American Federationist*, XXXIX, 1025.

¹² Harry Jerome, *Mechanization in Industry*, National Bureau of Economic Research, New York, 1934, p. 172.

probability that the machine revolution which has already released about a fourth of our available labor force from manual forms of toil¹³ will continue to make demands on the time of a relatively smaller number of the total working population. This will release even more persons for finance, trade, service, and clerical occupations. That some of them will be needed in these occupations is indicated by the situation now confronting industry—the growing necessity of moving its goods into the hands of final consumers. Under these circumstances it is reasonable to anticipate that the number of clerks of the semiskilled, machine-operator type will continue to increase more rapidly than the rate of growth of all gainful workers.

Sex of Clerical Workers

The transformation of the Clerical group is indicated in the following percentage display.

Census	Males	Females
1910	64.2	35.8
1920	52.2	47.7
1930	48.5	51.5

In 1930, there were 48.5 per cent males, 51.5 per cent females. In a word, so far as female workers are concerned, a whole new series of occupations has opened to them. The rate of growth in the number of males in clerical occupations has been rapid, but not equal to that of females.

Males in clerical occupations increased 808,360, or, as may be seen from Table 285, a percentage increase of 77 per cent during the twenty years. But the number of females in the same group increased 1,388,931, or at the rate of 237 per cent.

TABLE 285
PERCENTAGE CHANGE OF SUBGROUPS IN CLERICAL OCCUPATIONS
FROM 1910 TO 1930

Occupational Group	Percentage Change, 1930 over 1910		
	Total	Males	Females
Total Clerical	+134.6	+ 77.2	+237.7
Bookkeepers, Cashiers, and Accountants	+ 91.2	+ 49.5	+157.9
Clerks (except in stores)	+177.2	+115.8	+476.0
Messengers, Errand and Office Boys and Girls	- 16.3	- 15.8	- 20.7
Stenographers and Typists	+156.1	-32.5	+194.4

¹³ Ralph G. Hurlin and M. B. Givens, *Recent Social Trends in the United States*, McGraw-Hill Book Company, New York, 1933, p. 289.

Each subdivision within the Clerical group has experienced phenomenal growth. General Clerks, which has been the numerically dominant subgroup, increased at the most rapid rate. The rate of growth of the Stenographers and Typists group was also rapid, and brought about the introduction of many thousands of female workers into the gainfully employed group. (See Table 282, p. 585.) In all subgroups, the rate of increase in the number of female workers far exceeds that of male workers.

By turning again to Table 283 it will be seen that male clerical workers comprised 3.5 per cent of the total number of males gainfully employed in 1910 and in 1930 constituted 4.8 per cent of that labor force. Female clerical workers, on the other hand, as indicated in Table 282, comprised 7.2 per cent of the total number of female workers in 1910 and, in 1930, 18.3 per cent.

How the sexes compared during the decades 1910-1930 in the several subgroups which make up the Clerical group is shown in Table 286.

TABLE 286

SEX COMPOSITION OF THE SUBGROUPS WITHIN THE CLERICAL GROUP FOR EACH DECADE, 1910-1930

		Bookkeepers, Cashiers, and Accountants	Clerks (except Clerks in Stores)	Messengers, Errand and Office Boys and Girls	Stenogra- phers and Typists	Totals
1910	Total	29.8	44.2	6.6	19.4	100.0
	Male	18.3	36.7	5.9	3.3	64.2
	Female...	11.5	7.5	.7	16.1	35.8
1920	Total	24.9	50.4	3.8	20.8	99.9
	Male	12.7	34.4	3.3	1.7	52.2
	Female...	12.2	16.0	.5	19.1	47.7
1930	Total	24.3	52.2	2.4	21.2	100.1
	Male	11.7	33.7	2.2	.9	48.5
	Female...	12.6	18.5	.2	20.3	51.6

In 1910, the dominant subgroup was that of clerks who did general clerical work in offices and factories. This subgroup constituted 44 per cent of the Clerical group, only 7.5 per cent of whom were women. By 1930 the conditions had changed to such an extent that 52 per cent of the Clerical group was made up of general clerks and women engaged as such clerks comprised 18 per cent of the entire Clerical group.

Stenographers and typists were not recorded among clerks

in 1870; but in 1930 they constituted 21 per cent of all clerical workers. Female stenographers and typists constituted 20 per cent of all clerical workers in 1930.

Bookkeepers, Cashiers, Accountants

From the standpoint of pay received this group constitutes the upper level of clerical workers, at least that portion who still perform their duties largely by hand. Where mechaniza-

TABLE 287

BOOKKEEPERS, CASHIERS, AND ACCOUNTANTS:* PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	
Total population ...	.160	.210	.255	.335	.529	.695	.758
All gainful workers, male and female .	.494	.607	.701	.877	1.275	1.765	1.906
[Males of]							
All male gainful workers .....	.560	.666	.699	.761	.995	1.136	1.176
[Females of]							
All female gainful workers .....	.107	.281	.709	1.394	2.137	4.201	4.489

* Bookkeepers, Cashiers, and Accountants transferred from Trade and Transportation in 1870, 1880, 1890, and 1900.

tion has been fully introduced, such workers are reduced to the level of office-machine operators and suffer a considerable reduction in pay. Judging by the rate at which office machinery and semiautomatic accounting systems have replaced older methods, and the increasing need for accurate permanent records even in smaller business firms, the transfer to mechanized bookkeeping and account keeping will probably continue to affect adversely the number of hand-working bookkeepers and accountants, and will greatly increase the number of machine operators used in offices.

How the Bookkeeper, Cashier, and Accountant group has developed during the sixty-year period is shown in Table 288.

Not only did the number of bookkeepers, cashiers, and accountants increase eighteen-fold from 1870 to 1930, but the growth of this subgroup has been continuous. The difficult conditions affecting the taking of the census before 1890 make it necessary to discount somewhat the authenticity of the records for these earlier years (see chapter i); but since then the

TABLE 288

PERCENTAGE INCREASE OF BOOKKEEPERS, CASHIERS, AND ACCOUNTANTS
COMPARED WITH THE INCREASE OF THE TOTAL GAIN-
FULLY EMPLOYED, 1870-1930

Year	Bookkeepers, Cashiers, and Accountants	Total Gainfully Employed
1870 .....	....	....
1880	71.0	39.1
1890	51.0	30.7
1900	59.9	27.9
1910	90.9	31.3
1920	50.9	9.0
1930	26.7	17.3
1930 over 1870.....	1,407.4	290.5

rate of growth in each decade exceeded 50 per cent until the period from 1920 to 1930, when it dropped perceptibly.

In the decade from 1900 to 1910 these clerical workers grew enormously in numbers. This is the period of their most abrupt and important increase. It coincides with the general expansion in trade and selling, the rapid introduction of new methods of business management, and technological changes in business apparatus.

While the number of bookkeepers, cashiers, and accountants in 1930 exceeded by 195,960 the number ten years earlier, the rate of increase as indicated in Table 288 had dropped to 26 per cent, the lowest recorded by the census. In fact, fewer new bookkeepers, cashiers, and accountants were added to the Clerical group in the decade ending in 1930 than in any previous census record since 1900. It may be that the mechanization of this branch of clerical service, and the forces already described which are at work in modifying industry, have combined to slacken the rate of growth. If this situation continues for several decades, there may be an absolute as well as a relative decline in such clerical occupations.

During the period of great industrial expansion immediately following the Civil War, bookkeeping, cashier, and accounting occupations were almost solely men's work. Very few women were employed in such occupations until after 1890. However, the proportion of women in this group increased rapidly after 1900; by 1920 almost half of its workers were women, and by 1930 women were more than half of the group.

The rate of growth in the number of women employed as

bookkeepers, cashiers, and accountants gives an important clue to probable future development. From 1910 to 1930, the period when the number of such workers increased most rapidly, and when modern mechanical devices and uniform systems were being most extensively installed, males engaged as bookkeepers, cashiers, or accountants increased 49 per cent, while females in these occupations increased 158 per cent. Not only were females the larger number engaged in these types of clerical occupation in 1930 but their number had grown three times as fast as that of males. With all indications that mechanization and uniform practices will continue to expand in business firms, there is every reason to expect that the number of bookkeepers, cashiers, and accountants will increase in the immediate future and that this field of endeavor will become more exclusively women's work.

Clerks (Except Clerks in Stores)

Such clerical workers perform office work not specifically recorded as bookkeeping and accounting or stenography and typing. The caption includes Office-Appliance Operators,

TABLE 289

CLERKS (EXCEPT CLERKS IN STORES):* PERCENTAGE OF TOTAL POPULATION AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	
Total population ....	.626	.791	.936	.916	.783	1.408	1.627
All gainful workers, male and female ..	1.931	2.282	2.578	2.395	1.888	3.575	4.090
[Males of] All male gainful workers	2.204	2.571	2.738	2.488	1.987	3.072	3.389
[Females of] All female gainful workers .....	.341	.670	1.808	1.982	1.519	5.523	6.571

* Clerks transferred from Trade and Transportation in 1870, 1880, 1890, and 1900.

Shipping and Billing Clerks, Weighers, and Stock Clerks. This is a heterogeneous collection of occupations which frequently have little in common. The relative importance of each division within the group can be seen in Table 290.

The census grouping of workers under the caption "Other General Clerks" is unsatisfactory for detailed analysis, but does indicate that the greater portion of both males and fe-

TABLE 290
NUMBER AND PERCENTAGE DISTRIBUTION OF TYPES OF CLERKS (EXCEPT
CLERKS IN STORES), 1930

Group	Total		Males		Females	
	Number	Percent- age	Number	Percent- age	Number	Percent- age
Office-Appliance Opera- tors	38,098	1.90	5,380	0.41	32,718	4.63
Shipping Clerks	148,678	7.44	144,422	11.19	4,256	0.60
Weighers	14,307	0.71	12,872	0.99	1,435	0.20
Other General Clerks ...	1,795,917	89.93	1,127,773	87.39	668,144	94.56
Total	1,997,000	100.0	1,290,447	100.0	706,553	100.0

males engaged in general clerical work in 1930 were office and business clerks performing the usual filing and paper work required by modern business. Most office-appliance workers were women; most shipping and weighing clerks were men. Of all general office clerks, 35 per cent were females and 65 per cent males. As women come to be more generally accepted in business, it is possible that many of the general clerical positions still occupied by men will be usurped by women because their comparable ability has been proved and because they can be hired for considerably less pay.

In recent decades the mechanization and standardization of office practice has brought about an upward trend in the group of General Office Clerks as compared with the trends of the other subgroups within the Clerical group. General office clerks can manage an increasing number of operations that were formerly done by specially trained clerical workers.

Messenger, Errand, and Office Boys and Girls

According to the Horatio Alger tradition, the start of the successful American businessman was made as an enterprising office boy. His type has not fared so well in the face of a public policy which frowns upon child labor, a growing acceptance of the importance of a high-school education, and the substitution of mechanical office equipment and communication devices for personal service. The effect of such influences is shown clearly in the fact that from 1910 to 1930, during the era of greatest industrial expansion, the actual number of messengers declined by 17,656, or 16 per cent.

Messengers and errand boys and girls, while declining in actual number only since 1920, have also decreased since 1910

in percentage of all gainful workers, until in 1930 they represented a smaller percentage than in 1890. They have always been of relatively minor numerical significance in the working population of the United States, and there is little happening to suggest that they will assume any greater importance in the future.

In 1920, of this group 12 per cent were females and 87 per cent males, but by 1930 females had declined to 10 per cent of the group. The numerical peak year was 1920. From then until 1930 the number of male workers in these occupations decreased 17 per cent, whereas that of female workers decreased 37 per cent. These trends indicate that this group has been increasingly masculine in character and point, moreover, to fewer occupational opportunities for both sexes.

Stenographers and Typists

The rapid growth of this group was caused by the influence of such factors in modern business expansion as increasing business needs for correspondence, the improvement of the

TABLE 291

STENOGRAPHERS AND TYPISTS:* PERCENTAGE OF TOTAL POPULATION
AND OF ALL GAINFUL WORKERS, 1870-1930

Base	1870	1880	1890	1900	1910	1920	1930
Total population029	.053	.148	.344	.582	.661
All gainful workers, male and female085	.147	.386	.830	1.478	1.661
[Males of] All male gainful workers062	.065	.110	.177	.152	.095
[Females of] All female gainful workers216	.543	1.619	3.261	6.606	7.209

* Stenographers and Typists transferred from Trade and Transportation in 1870, 1880, 1890, and 1900.

typewriter, the development of uniform systems of stenography, the mass plan of schooling typists and stenographers, the competency and acceptance of women in this service, and their employment at relatively low wages. Such workers were not recorded in a separate category in the censuses before 1880, indicating that until then they were of insignificant numbers. Only seven women stenographers were noted in 1870.

Not only did the number of stenographers and typists grow

from practically none in 1870 to 811,190 in 1930 but by this latter year such workers had become a fifth of all clerical workers and 1.7 per cent of the total gainfully employed. This sixty-year trend might lead to the conclusion that a maximum has not yet been reached; but the figures for the last two censuses relative to both the total Clerical group and to the total of workers suggest a gradual stabilizing of the size of the group.

The largest number of male stenographers and typists was reported in 1910. This number has diminished materially since then, declining 32 per cent from 1910 to 1930, when men comprised only 4.4 per cent of all persons engaged in stenography and typing.

On the other hand, the number of female stenographers and typists has been growing rapidly since the turn of the century, having increased 194 per cent from 1910 to 1930. Whereas women listed as stenographers and typists made up only a fraction of 1 per cent of the total of gainfully employed females in 1880, their number had grown to such an extent that by 1930 they comprised 7.2 per cent of this labor force. Of all females listed in clerical occupations, Stenographers and Typists were 39 per cent in 1930. However, despite the rapid increase, their percentage of the female Clerical group has declined from a peak of 45 per cent in 1910 to 39 per cent in 1930.

The percentage gain by decades of the Stenographer and Typist group is indicated in Table 292.

TABLE 292
PERCENTAGE INCREASE OF THE STENOGRAPHER AND TYPIST GROUP COMPARED WITH THE INCREASE OF THE TOTAL GAINFULLY EMPLOYED, 1880-1930

Census	Stenographer and Typist Group	Total Gainfully Employed
1880 .....	.....	.....
1890	127.13	30.7
1900	236.23	27.9
1910	181.84	31.3
1920	94.24	9.0
1930	31.87	17.3
1930 over 1880.....	413.42	180.8

The greatest percentage gain occurred from 1890 to 1900, at a time when the numbers involved were small. The gain each decade thereafter has slackened markedly, until by 1930 it amounted to only 32 per cent. This trend probably indicates that the saturation point mentioned previously in this discussion may be approaching.

INDEX

- Abstractors, 469, 470, 471, 472, 491
 Accountants, *see* Bookkeepers, cashiers, and accountants
 Actors and showmen, 493, 494, 495, 496, 497, 498, 500, 503, 512 f.
 Administrative and service workers, 131 ff.
 Adult education, 505
 Advertising, of cars, 389; and clerical occupations, 587; house-to-house, 442; income from, 524; photography used in, 520, 521; by radio, 378; in soap industry, 361; in tobacco industry, 338
 Age groups, of gainful workers, 12, 44-48; in glass industries, 217; of the labor force, 61; in the population, 3, 11; in schools, 504; in textile industries, 275
 Agents, automobile, 390; county, 469, 470, 471, 491; express, 413 ff.; insurance, 435, 441, 446 f.; manufacturers', 457; real estate, 435; station, 419; in steam railroads, 392 ff.; in trade, 436, 437, 438, 441, 442
 Agricultural implement factory operatives, 222, 236
 Agricultural implements, 138, 157
 Agricultural operators, 2. *See also* Farmers; Managers
 Agricultural pursuits, other, 74, 75, 86, 94
 Agricultural workers, distribution of, 73 ff.; number of, 8, 18, 26, 67; occupational groups of, 86; production by, 82, 98, 587; undercount of, 4, 13, 15, 74. *See also* Laborers
 Agriculture, carpenters in, 181; harness and saddles for, 259; gainful workers in, 15, 74, 75, 76; painters in, 182; population in, 71; productivity in, 82; sex groups in, 74 ff., 85, 97; trends in, 16, 18, 19, 20, 21, 22, 26, 38, 44, 71, 97
 Air mail, 410
 Air transportation, 376, 377, 379, 382, 408 ff., 430, 433, 434
 Aircraft industries, 157, 410
 Airplanes, 378, 408, 409, 411
 Alloys, 231
 Aluminum, 123, 157, 252
 American Express Company, 429
 American Medical Association, on earnings of physicians and surgeons, 537; on social medical practice, 540
 American Society of Civil Engineers, The, on unemployed engineers, 547
 American Telephone and Telegraph Company, 422, 424
 Ammunition, *see* Factories
 Antimony, 123
 Apprentices, building, 174, 176; in chemical industries, 367; in cigar industry, 341; to dentists, 540; to lawyers, 531; masons, 183; milliners, 292; in paper, printing, and allied industries, 298, 303, 312; to professions, 557; in semiprofessional pursuits, 557; in textile mills, 275; tin-smiths, etc., 249; in trade, 465; in transportation, 431, 432. *See also* Apprentices and helpers; Boiler-makers and apprentices; Blacksmiths, forgemen, hammermen, and apprentices; Carpenters and apprentices; Electricians and apprentices; Machinists, millwrights, toolmakers, and apprentices; Plumbers and apprentices
 Architects, 493, 494, 495, 496, 497, 499, 500, 501, 503, 517 f.
 Army, 272, 489
 Artists and teachers of art, 493, 494, 495, 496, 497, 498, 499, 500, 501, 503, 514
 Asbestos industry, 157
 Asphalt, 121
 Assayers, 353, 501. *See also* Chemists, assayers, and metallurgists
 Assemblers, 235
 Assistants, to dentists, etc., 557, 558, 559; in domestic and personal service, 583
 Attendants, women, 382; professional, 493, 494, 495, 496, 497, 500; semiprofessional, 557, 558 f., 583
 Authors, editors, and reporters, 493, 494, 495, 496, 497, 500, 503, 521-27
 Auto camps, *see* Tourist camps
 Auto laundries, 383 ff., 391
 Auto mechanics, 380
 Automobile factories, workers in, 222, 233, 234; engineers in, 549
 Automobile repair shops, 383 ff.
 Automobiles, cabinetmakers for, 199; competition offered, 401; glass for, 217; in California, 483; insurance on, 461; laws for, 528; markets for, 146; number of, 378; parts for, 227; petroleum for, 349; private, 389; radios for, 192; real estate, 462; roads for, 390; traffic control by, 486; value added by manufacture, 234, 235; welding of, 230. *See also* Motor vehicles

- Aviators, 408, 409
 Awning factories, *see* Sail, awning, and tent factories
 Baggage men, 392 ff.
 Baking industry, value added by manufacture, 320, 321
 Bankers, 435, 436, 437, 441, 443, 444, 447
 Barber shops, failures of, 456
 Barbers, hairdressers, and manicurists, 560, 561, 562, 563, 566
 Barnett, G. E., on glass factories, 214
 Barrel makers, *see* Coopers
 Bartenders, *see* Restaurant and lunch-room keepers, saloon operators, and bartenders
 Beet sugar, *see* Sugar; Sugar refining
 Bell Telephone System, 421
 Berle, A. A., on the legal profession, 531, 532
 Beverages, *see* Liquors
 Blacking, stains, and dressing industry, value added by manufacture, 366
 Blacksmiths, forgers, hammermen, and apprentices, 222, 232
 Blankbook, envelope, and tag factories, 298, 299, 300, 302, 303, 307
 Blast furnace and steel rolling mills, 138, 222, 237, 549
 Blueprints, 520, 521
 Boarding- and lodginghouse keepers, 567; in domestic and personal service pursuits, 561, 562, 563, 583
 Boat building, *see* Ship- and boat-building
 Boatmen, canalmen, and lock keepers, 402, 403
 Boilermakers and apprentices and helpers, 222, 232
 Boilerwashers and engine hostlers, 392, 393, 394
 Book and job printing, 309. *See also* Printing, publishing, and allied industries
 Books, 310, 312, 522, 523
 Bookbinders, 299, 310, 311
 Bookkeepers, cashiers, and accountants, 584, 585, 591, 592, 593, 594, 595, 596
 Boothblacks, 583
 Boots and shoes, 138, 157
 Bone black, carbon black, and lamp-black industry, 365, 366, 367; value added by manufacture, 365
 Bottles and jars, *see* Glass
 Boxes, paper, 157; fiberboard, 306. *See also* Paper-box factories
 Box factories, *see* Paper-box factories
 Box makers, 301, 302
 Brakemen, 392 ff.
 Brass, 240
 Brass mill workers, 244
 Brick and stone masons, 168, 183
 Brick, tile, and terra-cotta workers, 205, 210 ff.
 Bridges, cement for, 220; welding of, 230
 Brokers, 435, 436, 437, 441, 443, 444, 447, 457
 Brookings Institution, on steel, 239
 Brooms and brushes industry, 368, 369, 371, 372; value added by manufacture, 372
 Brown, Esther Lucile, on engineers, 547
 Buffers, *see* Filers, grinders, buffers, and polishers
 Builders and building contractors, 168, 178, 180
 Building industry, cabinetmakers in, 198; engineers in, 549; machinists in, 227, 228; painters in, 182
 Building operatives, 168, 186
 Building permits, 171, 173
 Building trades, 131, 150, 167 ff.
 Bus operators, *see* Operators
 Business cycles, 60, 172, 176, 416, 417, 423
 Business failures, 456-57
 Butchers, 450
 Butter, cheese, and condensed milk factories, 314, 321, 322
 Button factories, 265 ff., 270, 295
 Cable, *see* Rope and cordage factories
 Cabinetmakers, 194 ff., 198
 California, agriculture in, 78; automobiles in, 483; dentists in, 541, 542; doctors in, 538; fishing industry in, 112; fruit and vegetable canning in, 326; hotels in, 569; lawyers in, 531; mining in, 118, 119; occupational dissimilarity with Pennsylvania, 38; teachers in, 507; tourist camps in, 568
 Canals, 378, 405
 Canalmen, *see* Boatmen, canalmen, and lock keepers
 Candy, 314, 318; factories, 322
 Canning industry, value added by manufacture, 328
 Capital, 163; in brickmaking, 211; for farm owners, 88, 90, 97; in financial businesses, 443, 444; in glass industry, 212; for garage business, 387; for law business, 532; for manufacturing, 163; for medical practice, 536; mergers of, 588; and proprietorships, 62; in publishing industries, 312; for real estate operators, 462; in sail, awning, and tent industry, 286; for stores, 450, 455; for undertaking business, 464; in water transportation, 407. *See also* Finances

- Captains, masters, mates, and pilots, 403, 406
- Carpenters, 181, 184; and apprentices, 168, 179
- Carpet mills, 264, 265, 266, 267, 270, 282
- Carpets and rugs, 157
- Carriage factory workers, *see* Automobile and carriage factory operatives
- Cars, electric and steam, 157
- Cashiers, *see* Bookkeepers, cashiers, and accountants
- Casters, *see* Molders, founders, and casters
- Cellulose, 105
- Cement, 121, 127, 138, 157, 205, 219
- Cement finishers, *see* Plasterers and cement finishers
- Census, differences in enumerations of, 13, 95; listings in forestry and fishing, 100; occupational and industrial, 131, 285
- Census classification, of agents, 442; of attendants and helpers, 558; of "box makers," 301, 302; of chemical workers, 346, 367, 368, 370; of clerical workers, 584; of communication workers, 412, 413, 430, 434; of designers, draftsmen, and inventors, 515; of domestic and personal-service pursuits, 583; of engineers, 548, 549; of gainful workers, 24 f.; by industries, 149; of laundry workers, 578; of midwives and nurses, 580; of occupational groups, 180; of operatives in blankbooks, etc., industry, 307; of persons in trade, 465; of photographers, 519; of postal workers, 415; of printing, publishing, and allied workers, 308, 309, 310; of public officials, 492; of public service workers, 20, 468, 473, 479; of sailors, 405; of semiprofessional and recreational pursuits, 557; of servants, waiters, housekeepers, and stewards, 573; of social and welfare workers, 554; of straw workers, 374; of textile and clothing workers, 263, 280, 293, 294, 296, 298; of transportation and communication workers, 430; of turpentine farmers, 362; of undertakers, 463
- Census-taking, 3, 4, 5, 74, 108, 110
- Chain banks, 444, 445
- Chain hotels, 569
- Chain newspapers, 524, 525
- Chain stores, 320, 455, 588. *See also* Stores
- Chambermaids, 574
- Charcoal and coke, 344, 345, 346, 349, 353
- Charwomen and cleaners, 583
- Chauffeurs, 380, 383 ff., 391, 482
- Cheese, *see* Butter, cheese, and condensed milk factories
- Chemicals and allied industries, carpenters in, 181; engineers in, 549; of manufacturing and mechanical group, 131, 150; machinists in, 227; painters in, 182; value added by manufacture, 354 ff.; workers in, 343 ff.
- Chemists, assayers, metallurgists, 353, 493, 494, 495, 496, 497, 498, 500, 503, 544-46
- Child labor, 3, 44, 45; in glass industries, 217, 275
- Children, on farms, 71 ff., 95; in schools, 504 f.
- Chiropractors, 557
- Churches, 528
- Cigar and tobacco group, 131 ff., 150, 336
- Cigar production, 139, 157, 336, 337, 338, 341
- Cigar stores, 456
- Cigarettes, 139, 157, 336, 337, 338, 343
- Cinemas, 513, 520. *See also* Motion pictures
- Civil engineers, as architects, 518
- Civilian Conservation Corps, 108, 477
- Clay, glass, and stone: carpenters in, 181; machinists in, 227; engravers in, 308; occupational group, 205 ff.; painters in, 182; workers in, 131, 132, 133, 134, 150
- Clay products, 138, 157, 211
- Cleaning and dyeing workers, and pressers, 561, 562, 563, 566, 570 f.
- Clark, Harold F., on architects' earnings, 518; on engineers' earnings, 550; on lawyers' incomes, 533; on reporters' salaries, 526; on teachers' salaries, 506
- Clergymen, 493, 494, 495, 496, 497, 498, 500, 501, 527-29
- Clerical service, 17, 18, 19, 21, 22, 584 ff.
- Clerks, in automobile industry, 235; in the clerical group, 584, 585, 596, 597; Edwards' classification of, 41-43; in fire departments, 481, 482; general, 593; postal, 417; semiskilled, 592; for social-security work, 589; in stores, 458; telegraph, 419. *See also* Mail clerks and Salesmen and saleswomen
- Clock- and watchmakers, 240, 246
- Clothing Industries, 143, 157; machinists in, 227, 263 ff.; ready-to-wear, 296. *See also* Textiles and clothing
- Coal miners, 2, 116-26, 129
- Coal mining, 549
- Coat factories, *see* Suit, coat, and over-all factories
- Cobblers, *see* Shoemakers

- Coke, 138, 143, 157. *See also* Charcoal and coke
- Colburn glass process, 216
- Collars, 157, 290. *See also* Shirt, collar, and cuff factories
- College presidents, *see* Teachers and professors
- Commercial travelers, 436, 437, 441, 445, 448. *See also* Salesmen and saleswomen
- Communication, banking affected by, 446; chain stores affected by, 455; crime affected by, 483; effect on publishing, 312; and food distribution, 316; laborers in, 379, 433, 434; newspapers affected by, 525; systems of, 378 ff., 591; unemployment in, 2; workers in, 376 ff., 412. *See also* Transportation and communication
- Concentration, in banking, 446; of business, 387; in carpet factories, 283; in corset factories, 294; in flour milling, 317, 331, 332; in garage business, 387; in hotel business, 569; in knitting mills industry, 282; in industry, 204; in motor vehicle industry, 236; in newspaper publishing, 526; in paper and pulp industry, 305; in printing industries, 312; in steel industry, 240; in trade enterprises, 454, 455; in woolen-goods industry, 277. *See also* Mergers; Monopolies; Single units
- Concrete, 218, 220. *See also* Cement
- Conductors, bus, 383 ff.; in steam railroads, 392 ff.; on street railroads, 399 ff., 402
- Confectionery production, 138, 157
- Confectionery stores, 456
- Conservation, of forests, 105, 106; of fish, 112
- Constables, 469, 470, 471, 472, 488
- Construction, of automobile glass, 217; of electric plants, 194; labor force in, 172; of lumber products, 204; of roads, 181, 391, 490; in telephone industry, 427; for transportation and communication, 380
- Consumption, of butter, cheese, and condensed milk, 321; of candy, 323; of canned fruits, 326, 327; of fish, 325; of meat products, 328, 329; of petroleum, 357; of soap, 361; of sugar, 335; of vegetables, 328, 329
- Contractors, *see* Builders and building contractors
- Converse, Paul D., on business failures, 456
- Cooks, 573, 574
- Cooper, Courtney Ryley, on crime, 484
- Coopers, 194 ff., 202, 203
- Copper, 121, 123, 158, 240 ff.
- Copper factory operatives, 245
- Coppersmiths, 249
- Cordage and twine, 157. *See also* Rope and cordage factories
- Corey, Lewis, on technology, 57
- Corn, 77, 82, 84, 86
- Corporations, automobile-fuel, 391; federal report on, 305; laws for, 528; lawyers for, 532; life of, 457; nature of, 155; number of, 151; sugar, 335; telephone, 421; in the United States, 588. *See also* Concentration; Monopolies; Ownership; Proprietorships
- Corset factories, 265 ff., 270, 294
- Cosmetics, 364, 365, 567; value added by manufacture, 364
- Cotton, 77, 82, 84, 88, 96
- Cotton goods, 138, 157, 276
- Cotton mills, 264, 265, 266, 270, 272, 273, 274, 275
- Crime, 484, 485
- Crops, 77, 82 ff., 84, 99
- Dairy farmers, 74, 75, 85, 92
- Dairymen, 19
- Davis, Joseph S., on agricultural workers, 26
- Davis, Michael M., on dentistry, 542
- Deckhands, *see* Sailors and deckhands
- Decorators, 465, 466
- Deliverymen, 465, 578
- Dental technicians, 541
- Dentists, 493, 494, 495, 496, 497, 500, 501, 503, 540
- Department of Labor, on hosiery, 282
- Designers and draftsmen, 493, 494, 495, 496, 497, 498, 500, 515-17
- Detectives, 469, 470, 471, 488
- Distributors, number of, 30
- Doctors, *see* Physicians and surgeons
- Dodd, Paul A., on doctors' incomes, 538; on dentists' incomes, 542
- Domestic and personal service, engravers in, 308; others in, 561, 562, 563, 583; trends in, 17, 18, 19, 20, 21, 22, 38; workers in, 560 ff.
- Draftsmen, *see* Designers and draftsmen
- Drapers, 465, 466
- Draymen, teamsters, and carriage drivers, 383 ff.
- Dressmakers and seamstresses, 265, 267, 269, 296
- Druggists' preparations, 363; value added by manufacture, 363
- Drugstores, 452, 453, 454, 455, 460
- Durable goods, 143
- Dyeing and finishing of textiles, 157, 265, 266, 267, 270, 287
- Editor and Publisher*, on newspaper monopolies, 525

- Editors, *see* Authors, editors, and reporters
 Education, *see* Schools; Teachers and professors
 Edwards, Alba M., occupational scale, 40-43
 Electric lamps, 138, 191
 Electric railways, 378, 380, 401
 Electric welding, 231
 Electrical industries, 188 ff., 193, 549
 Electrical workers, 131, 150, 187 ff.
 Electricians, and apprentices, 187 ff.; in fire departments, 482
 Electroplaters, 240
 Elevator tenders, 561, 562, 563, 566, 571
 Embalmers, 464, 465
 Embroidery mills, *see* Lace and embroidery mills
 Employees, in candy industry, 323; civil service, 473, 476; of government, 472, 473, 477; of oil works, 349; in stores, 452, 453, 454, 455, 459; of tourist camps, 568. *See also* Wage earners
 Employment, in chemical industries, 343; clerical, 587; of doctors, 536; in early days, 377; of engineers, 546, 547, 551; in fire departments, 481; fallacious theories of, 22-24; of guards and watchmen, 488; of librarians, 553; of males in personal service, 566; in manufacturing industries, 138, 143 ff.; of nurses, 581; in metals industries, 246; in paint production, 359; part-time, 289; of policemen, 487; of sailors, 405; of servants, 565, 572; in steam railroads, 397; in stores, 459, 460; of teachers, 506; in telephone industry, 421; of women, 586. *See also* Unemployment
 Enamelers, *see* Painters, glaziers, and enamellers
 Enamelware makers, *see* Tinware and enamelware makers
 Engineers, civil, 547; electrical, 547, 548; fire department, 482; and firemen, 164; in gas works, 549; industrial classification of, 549; as inventors, 516; locomotive, 392 ff.; mechanical, 547; stationary, 159 ff.; technical, 493, 494, 495, 496, 497, 498, 499, 500, 501, 546-51
 Engravers, 298, 299, 300, 301, 302, 303, 308
 Envelopes, *see* Blankbook, envelope, and tag factories
 Erosion, 59, 107
 Explosives, 157, 344, 348, 354. *See also* Factories
 Exports, of meat, 329
 Express companies, failure of, 456; workers in, 413, 428 ff. *See also* Agents, express
 Express messengers, *see* Messengers
 Extraction of minerals, trends in, 16, 18, 19, 20, 21, 22, 32. *See also* Minerals
 Fabrication, electrical, 190; of automobile parts, 227; of houses, 175
 Factories, automobile, 222, 233, 234, 549; blankbook, envelope, and tag, 298, 299, 300, 302, 303, 307; butter, cheese, and condensed milk, 314, 321, 322; button, 36, 265 ff., 270, 295; candy, 322; copper, 245; corset, 265 ff., 270; explosives, ammunition, and fireworks, 344, 349, 354; fertilizer, 344 ff.; furniture, 194, 199; glass, 212; glove, 265, 266, 267, 270, 293; jewelry, 308; organ, 194 ff., 201; paints and varnishes, 344 ff., 349, 358; paper box, 298 ff., 302, 303, 306; piano and organ, 158, 194 ff., 201; sail, awning, and tent, 264 ff., 270, 285; shirt, collar, and cuff, 265, 270, 288 ff.; soap, 361; suit, coat, and overall, 265 ff., 270, 290
 "Family workers," 74, 96, 98
 Farm demonstrators, 469, 470, 471, 491
 Farm managers, *see* Managers
 Farmers, definition of, 87; Edwards' classification of, 41-43; effects of transportation and communication on, 375; planters and overseers, 74, 75, 89 ff.; in stock raising, 94, 98; turpentine, 362. *See also* Owners
 Farms, production of, 78, 83 ff.; number of, 84, 91; cement used on, 220; population on, 71 ff.
 Federal Bureau of Criminal Identification, 483
 Federal employees, 473, 477
 Federal forests, 103, 105, 106
 Federal Trade Commission, on corporations, 305; on flour mills, 332
 Females, in administrative and service group, 160; in agriculture, 75, 77, 85, 90, 95, 97; in automobile factories, 227, 233; barriers against, 62; in building trades, 168, 170, 178, 185; in chemical industries, 347, 350, 360, 368; in clay, glass, and stone industries, 206, 207, 210; in clerical occupations, 585, 592, 593, 594, 596, 597, 598, 599; in communication, 416, 425, 426; in domestic and personal service, 563, 564, 565, 566, 567, 572, 577, 579, 580; in electrical industries, 188; in food industries, 314, 316, 322, 324, 330; in forestry and fishing, 100, 102; gainfully employed, 3, 11, 15, 44; in iron and steel industries,

- 221, 222, 225; in laborers group, 166; in leather industries, 255, 257, 259; in lumber and furniture industries, 195, 197; in manufacturing and mechanical group, 134; in the metals group, 244; as music teachers, 510; in paper-box factories, 306; in paper, printing, and allied industries, 299, 301; in professional pursuits, 496, 497, 499, 500, 501; in the public service, 471, 472, 478; as teachers, 502, 503; in textiles and clothing industries, 263, 268, 269, 271, 272, 275, 280, 281, 294, 297; in tobacco industries, 336, 339; in transportation and communication, 376, 378, 382, 385, 386, 394, 395, 403, 432, 433, 434; in trade, 435, 438, 441, 450, 459, 466
- Fertilizer factories, 344 ff., 349, 356
- Fertilizer production, 138, 157
- Filers, grinders, buffers, and polishers, 240, 241, 242, 252, 253
- Finances, for automobile transportation, 390; for business combines, 305. *See also* Capital
- Fire captains, 482
- Firearms, 157
- Firemen, locomotive, 392 ff., in the public service, 469, 470, 471, 479-82; stationary, 160, 164
- Fireworks, *see* Factories
- Fish, 113, 138; curing and packing of, 314 ff., 324 ff.
- Fish oil, 112
- Fishermen, 100, 101, 110-14
- Fishermen and oystermen, 101, 110, 111
- Floorwalkers, 447
- Flagmen, *see* Switchmen and flagmen
- Florists, *see* Gardeners, florists, and nurserymen
- Flour, 138, 317, 331. *See also* Grain, flour, and feed mills
- Food industries, 335; carpenters in, 181; machinists in, 227; in manufacturing and mechanical group, 131, 132, 133, 145, 150, 313 ff.; painters in, 182; retail, 452, 453. *See also under name of food*
- Foremen, in administrative and service group, 159, 160, 164; in automobile industry, 235; of cleaning and dyeing establishments, 570; Edwards' classification of, 41-43; in laundries, 578; in mineral extraction, 116, 127; in road and street building and repairing, 469, 470, 471; of steam railroads, 392 ff.; of street railroads, 399, 400; of telegraph and telephone companies, 413, 414, 415, 418, 425, 427; in trade, 447; in transportation and communication pursuits, 430, 431, 432
- Forestry, carpenters in, 181; division of, 107; gainful workers in, 103, 105; and fishing, 16, 17, 18, 19, 20, 21, 22, 38, 100
- Forgemen, *see* Blacksmiths, hammermen, and forgemen
- Forthne, on the baking industry, 320; on the beauty business, 567; on house servants, 574; on trolley transportation, 402; on women's hats, 293
- Founders, *see* Molders, founders, and casters
- Foundries, 139
- Fourcault glassmaking machine, 216
- Freight, 388, 389, 395, 396, 397, 405, 406, 407
- Fruit and vegetable canning, 314 ff., 324 ff.
- Fruits, 138, 157, 324, 325, 326, 327. *See also* Fruit and vegetable canning
- Fuel, 110, 125, 391
- Furnacemen, smeltermen, heaters, puddlers, etc., 222, 232
- Furniture, factories, 194, 199; production of, 138, 157; stores, 452, 453, 455; of welded steel, 230. *See also* Lumber and furniture
- Gainful workers, in administrative and service group, 166; age and sex of, 11, 12, 44-48; in agriculture, 70, 74, 75, 76, 77, 95, 567, 569, 570, 571, 577, 579, 583; in air transportation, 408, 409, 431, 432; architects, 517; as artists, 514; as authors, 521; in building trades, 168, 170, 176; in chemical and allied industries, 347, 349, 353, 358, 359, 368, 369; as chemists, assayers, and metallurgists, 544; children as, 3, 44, 45; in clay, glass, and stone industries, 206, 209, 219; as clergymen, 527; in clerical occupations, 584, 585, 586, 593, 594, 595, 598, 599; in coal mining, 129; in communications, 412, 413, 416, 431, 432; composition of, 43; as dentists, 540; in domestic and personal work, 560, 561, 562, 563, 564; in electrical group, 187 ff.; in extraction of minerals, 115, 117; in food industries, 313 ff., 322, 324; in forestry, 103; in forestry and fishing, 100-102; incomes of, 538; industrial classification of, 29, 31 ff.; as insurance agents, 461; in iron and steel, 222, 224, 228, 229; in laborers group, 166; as lawyers, 529; in leather group, 256, 258; in lumber and furniture group, 195, 197; in manufacturing and mechanical group, 134, 149; in metals group, 242; by occupations, 15 ff., 65 ff.; in paper, print-

- ing, and allied industries, 298 ff., 308; as photographers, 519; as physicians and surgeons, 534; in the professional service, 493, 494, 495, 496, 497; in public service, 468-71; relief workers as, 477; revised figures for, 13, 14; as salesmen and saleswomen, 458, 459, 460; sex groups of, 15-20; as teachers and professors, 501, 502; in textile and clothing group, 263 ff., 268, 277, 280; in trade, 435, 436, 437, 438, 439, 449, 450, 466; in transportation and communication, 376 ff., 386, 394, 395, 400, 403, 404; unemployed, 24; as veterinarians, 544
- Garage owners, managers, and officials, 383, 384, 385, 387. *See also* Operators, of garages
- Garbage men, 561, 562, 563, 583
- Gardeners, florists, and nurserymen, 74, 75, 85, 93
- Gas and electric welding, 231
- Gas and steam fitters, 185. *See also* Plumbers and apprentices
- Gas-well workers, *see* Oil and gas wells, workers in
- Gas workers, 344, 345, 347, 348, 349, 357. *See also* Engineers, in gas works
- Gaugers, 465, 466
- Gehlke, C. E., on laws, 483; on police, 488
- Gelatin, *see* Glue and gelatin
- Gill, Corrinton, on technology, 57
- Givens, Merideth B., on manufacturing employment, 147
- Glass: bottles and jars, 212; factories, 212; laborers in, 205; production of, 138, 157, 214; tubing, 216; value of, 182. *See also* Clay, glass, and stone group
- Glaziers, 168. *See also* Painters, glaziers, and enamellers
- Glass blowers, 136, 212
- Glove factories, 265, 266, 267, 270, 293
- Glue and gelatin, 364, 366; value added by manufacture, 364
- Gold, 120, 121, 125; and silver mining, by states, 118
- Goldsmiths, 240
- Grain, flour, and feed mills, 331. *See also* Flour
- Grattan, Hartley C., on occupational trends, 586
- Grinders, *see* Filers, grinders, buffers, and polishers
- Grocery stores, 455, 456, 460
- Guards and watchmen, 469, 470, 471, 488
- Gunsmiths, 240
- Gypsum, 121
- Hairdressers, *see* Barbers, hairdressers, and manicurists
- Hammermen, *see* Blacksmiths, hammermen, and forgemen
- Hardware, 157, 245, 452, 453, 455, 460
- Harness and saddles, 254, 256, 257, 258, 259
- Hats, 157, 265, 266, 267, 270, 291, 293. *See also* Milliners and millinery dealers
- Hay, 78, 84
- Healers (not elsewhere classified), 557
- Heaters, *see* Furnacemen, smeltermen, heaters, puddlers, etc.
- Helpers, 467, 493, 494, 495, 496, 497, 500. *See also* Apprentices; Attendants
- Hemp, jute, and linen mills, 264, 265, 270, 284, 298
- Highways, 390, 485. *See also* Roads
- "Hired workers," 89, 96
- Hosiery, 281, 282
- Hostlers and stable hands, 383 ff.
- Hotels, 320, 561, 562, 563, 568 ff.
- Housekeepers, *see* Servants, waiters, housekeepers, stewards
- Hucksters and peddlers, 435, 436, 437, 441, 449
- Hunters, trappers, and guides, 583
- Hurlin, Ralph G., on manufacturing employment, 147; on social workers, 554; on tradespeople, 440
- Hygienists, dental, 541
- Ice cream, 138, 143
- Immigration, 377, 572
- Imports, 287, 359
- Income, of agents, 443; of artisans, 174; of artists, 514; of clergymen, 528; of dentists, 542; distribution of, 48-51; of doctors, 536 ff.; of engineers, 549-51; on farms, 88, 92; of the gainfully employed, 538; in glass industry, 217; of lawyers, 520, 531, 533; and markets, 146; of newspapers, 524; of newspaper workers, 527; of pottery workers, 221; of social workers, 556; of store workers, 460; taxes on, 589; of telephone workers, 426; of teachers, 506. *See also* Wages
- Industrial classifications, of brick and stone masons, 183; of carpenters, 181; of engravers, 308; of engineers, 549; of the gainful workers, 3, 31, 150; of manufacturing and mechanical workers, 131, 150; of painters, 182; of plasterers and cement finishers, 184
- Industrial dispute, 60
- Inspectors, in automobile industry, 235; in extraction of minerals, 116, 127; fire, 482; in steam railroads,

- 392, 393, 394; in street railroads, 399, 400; telegraph and telephone, 413, 414, 418; in trade, 465, 466; in transportation and communication pursuits, 430, 431, 432
- Institutions, keepers of, 469 ff., 478, 490
- Insurance agents, *see* Agents
- Insurance, engineers in, 549; fire, 479, 480; health, 539; policies, 461; of servants, 575
- International Paper Company, 305
- Inventions, in airplanes, 410; in book-binding industries, 310; of button machines, 295; in cigar production, 341; for glass-making, 216; and industry, 545; in liquor industry, 332; in meat industry, 328; for offices, 590; for paper and pulp mills, 303; for printing, 309, 313; in radio, 418; for suit, coat, and overall factories, 290; for sulphur mining, 127; in telegraphy, 419; of telephones, 412. *See also* Machinery
- Inventors, 515, 516
- Iron and steel, carpenters in, 181; engineers in, 549; engravers in, 308; factory operatives, 239; forgings, 157; gainful workers in, 222 ff.; industrial data on, 138; machinery-factory workers, 222, 223, 224, 239; machinists in, 227; in manufacturing group, 131, 150; painters in, 182; structural workers in, 168
- Iron mining, 118, 119, 121. *See also* Scrap iron; Steel
- Janitors and sextons, 561, 562, 563, 576
- Jar industry, *see* Glass
- Jerome, Harry, on mechanization in cotton mills, 272
- Jewelers, 240, 241, 242, 246
- Jewelry, value added by manufacture, 247 ff.
- Jewelry factories, 308
- Jewelry stores, 460
- Job printing, *see* Book and job printing
- Jones, Lewis W., on dentistry, 541
- Journalists, *see* Authors, editors, and reporters
- Journal of Educational Research*, on teacher training, 508
- Judd, Charles H., on teachers' salaries, 506
- Judges, *see* Lawyers, judges, and justices
- Justices of the peace, 469, 470, 471, 491. *See also* Lawyers, judges, and justices
- Jute mills, *see* Hemp, jute, and linen mills
- Kirkwood, M. R., on lawyers, 532
- Knit goods, 138, 281, 283
- Knitting mills, 264, 265, 266, 270, 271, 281, 283
- Kreps, Theodore J., on chemical industries, 352
- Labor, adequacy of, 9; costs of, 55, 145, 165, 342, 397; Edwards' on, 40 ff.; policies of, 289, 377; regrading of, 60; Southern, 106; technology and, 26, 56; upgrading of, 305. *See also* Department of Labor; Industrial disputes; Unions
- Labor-saving devices, 172, 185, 187, 232, 233, 341, 572, 574, 575. *See also* Machinery
- Laboratory technicians and assistants, 557
- Laborers, in administrative and service group, 134, 135, 159, 166, 167; agricultural, 69, 74, 75, 86, 94, 95, 96, 98, 99; in automobile industry, 235; in bakeries, 319; in box factories, 302; in brick, tile, and terra-cotta manufacture, 211; in charcoal and coke works, 353; in chemical industries, 348; in clay, glass, and stone industries, 205, 209; in cleaning and dyeing establishments, 570; in communication, 413 ff.; in domestic and personal service pursuits, 583; Edwards' classification of, 41-43; on farms, 15, 41, 43, 44, 86, 87; in fish canning, 325; in fruit and vegetable canning, 328; gain in, 148; in glass manufacture, 217; in grain, flour, and feed mills, 331; in laundries, 578; in leather, 254; in meat packing, 330; in metals, 245; in paper and pulp mills, 303, 304, 305; in pottery making, 220; in printing, publishing, and allied industries, 312; in professional service, 559; in the public service, 469, 470, 471, 492; in recreation, 559; in road and street building and repairing, 469, 470, 471; in soap factories, 362; in steam railroads, 399 ff.; in tinware and enamelware factories, 250; in textiles and clothing industries, 263, 268, 270, 274, 285, 287, 289, 290, 292; in trade, 465, 466, 467; in transportation and communication, 379, 380, 431, 432, 433, 434; unclassified, 159 ff.; in water transportation, 403
- Lace and embroidery mills, 265, 266, 267, 270, 286
- LaFollette Senate Investigating Committee, 489
- Lampblack, *see* Bone black, carbon black, and lampblack industry
- Lamp-chimney making, 215
- Lapidary industry, 247 ff. *See also* Jewelry

- Launderers and laundresses (not in laundries), 578
- Laundry operatives and managers, 561, 562, 563, 577 ff.
- Laws, building, 517; business, 528; for dentists, 540; federal, 482-484; social-security, 589; teacher tenure, 506
- Lawyers, judges, and justices, 493, 494, 495, 496, 497, 498, 500, 501, 529 ff.
- Lead, 121, 123, 158, 240 ff., 249
- Leather, carpenters in, 181; industrial data on, 138, 150, 157; in manufacturing group, 131, 132, 133, 134; operatives in, 260; painters in, 182, 253 ff.
- Leonard, Jonathan N., on automobile prices, 390; on steam railroad transportation, 397; on transportation and communication, 375
- Librarians, 551, 552 ff.; assistants to, 558, 559
- Life, on ship building, 404
- Lighting fixtures, 245
- Lime, cement, and artificial-stone workers, 205, 219. *See also* Cement; Stone cutters
- Linemen, 413 ff., 418, 425
- Linen mills, *see* Hemp, jute, and linen mills
- Liquors, 157, 202; and beverages, 314, 315, 316, 332
- Lithographers, *see* Printers and lithographers
- Livery-stable keepers, 383 ff.
- Lock keepers, *see* Boatmen, canalmen, and lock keepers
- Locksmiths, 240
- Logging camps, *see* Lumber
- Longshoremen and stevedores, 403, 405, 406
- Loom fixers, 265 ff., 287
- Looms, 283
- Lorimer, F., on farm population, 72
- Lubber cylinder machine, 216
- Lumber, 104, 105, 110, 131, 138, 171, 452, 453
- Lumber and furniture, carpenters in, 181; engravers in, 308; machinists in, 227; in manufacturing industries, 131, 150; painters in, 182, 194 ff.
- Lumbermen, 100, 101, 102, 108, 110. *See also* Timber cruisers
- MacDonald, T. H., on roads, 390
- Machinery, for baking, 319, 320; in blankbook, etc., factories, 307; for bookbinding, 310; brick-making, 211; for butter- and cheese-making, 322; in button factories, 295; in chemical production, 354; for cleaning and dyeing, 571; in cotton mills, 272, 274; for die-casting, 231; for dyeing and printing of textiles, 288; electrical, 157; and employment, 22, 23; on farms, 73, 83, 88, 96; for fish curing, 324; for fishing, 111; in flour mills, 317, 331, 332; glass-making, 212, 214; for handling freight, 396; industrial, 165; for industry, 228; for knitting, 281, 282; labor-saving, 200, 203, 231, 233; for lace-making, 286; in laundries, 577; in leather industries, 254, 259, 260; in liquor production, 332; lumber and furniture making, 197; in meat industry, 329; for metal manufacturing, 253; for metals, 245; for mining, 123, 124, 125; for offices, 590, 591; in paint and varnish production, 358; in paper and pulp mills, 303; for paper-box factories, 306; for pottery, 220; for road making, 391; in rubber factories, 359, 360; in shirt, collar, and cuff factories, 289; in stores, 467; in suit, coat, and overall factories, 290; for telephone construction, 428; for tinware and enamelware, 250; in tobacco manufacturing, 338 ff.; typesetting, 302. *See also* Labor-saving devices
- Machinery-factory workers, *see* Iron and steel
- Machinists, in fire departments, 482; by industries, 227, 228; and millwrights, toolmakers, and apprentices, 222, 223, 224, 227
- Machine tenders, 235, 275, 304
- Machine tools, 157, 231
- Magazines, 312. *See also* Periodicals
- Mail, air, 417, 421; volume of, 416
- Mail carriers, 413 ff., 415
- Mail clerks, railway, 413 ff., 428 ff.
- Males, in the administrative and service group, 159 ff.; in agriculture, 68-77, 82, 85, 95, 97; as barbers, hairdressers, and manicurists, 567; in building trades, 168, 170, 178; in candy factories, 322; in carpentering, 179; in chemical industries, 347, 350, 360, 368 ff.; in cigar and tobacco group, 336, 339; in clay, glass, and stone industries, 206 ff., 210; in clerical occupations, 592, 594, 596, 597, 598, 599; in coal mining, 129; as commercial travelers, 449; in communication, 416; in domestic and personal service, 562, 564, 565, 566; in electrical industries, 188 ff.; in extraction of minerals, 116; as farm operators, 90; in fish curing, etc., 324, 330; in food industries, 314 ff.; in forestry, 106; in forestry and fishing, 100-102; in fishing, 110; gainfully employed, 3, 11, 15, 44; in har-

- ness and saddle making, 259; as hotel keepers and managers, 569; in iron and steel manufacturing, 221, 222, 225; in the laborers group, 166; as laundry operatives and managers, 577; in leather industries, 255 ff., 259; in lumber and furniture industries, 195, 198; in machinists, millwrights, and toolmakers group, 228; in the manufacturing and mechanical group, 134; as merchants, 450; in metals group, 244; as musicians, 510; as nurses, 579; in paper-box factories, 306; in paper, printing, and allied industries, 299 ff.; in professional service, 495, 497, 499, 500, 501; in the public service, 470, 472, 478; as radio operators, 418; in road and street transportation, 384, 386; as salesmen, 459; as servants, etc., 572; in steam railroads, 393, 395; in street railroads, 400; in teaching, 502, 503; in telephone companies, 425; in textile and clothing industries, 263-95; in trade, 435, 437, 438, 441, 466; in transportation and communication, 376 ff., 382, 431, 432; in water transportation, 403, 404
- Managers, in the administrative and service group, 159 ff.; of cleaning and dyeing businesses, 570; Edwards' classification of, 41-43; in extraction of minerals, 116, 128; of farms, 87, 89, 91; of hotels and boarding houses, 560, 561, 562, 563; of insurance companies, 461; in motion-picture production, 557; in radio industry, 557; of telephone and telegraph companies, 413 ff., 418; of theaters, 557; in trade, 435, 436, 437, 441, 447; of transportation and communication enterprises, 431, 432. See also** *Garage owners, managers, and officials; Manufacturers and managers; Laundry operatives and managers; Owners*
- Man-hours, in agriculture, 82, 98; in automobile industry, 236; in cement, 127; in cotton textile mills, 273, 274; in lumber, 104; in lumber and furniture, 197; in manufacturing, 28, 137, 143 ff.; in mining, 122; in newspaper printing, 309; in steam railroads, 397. See also **Production****
- Manicurists, see** *Barbers, hairdressers, and manicurists*
- Manufacturers and managers, 157 ff., 162, 163**
- Manufacturing establishments, in automobile industry, 234; in baking, 321; in blacking, stains, and dressing industry, 366; in bone black, car-**
- bon black, and lampblack industry, 365; in broom and brush industry, 372; in button making, 295; in casket making, 464; in chemical industries, 350, 352, 354 ff.; in clock and watch industries, 247; in collar making, 290; in cosmetics industry, 364; in cotton goods, 276; in druggists' preparations industry, 363; in dyeing and printing of textiles, 288; in electrical machinery, 191; in fish canning, 326; in flour industry, 332; in fruit and vegetable canning, 328; in glass industry, 214; in glue and gelatin industry, 364; in jewelry industries, 247 ff.; in knitting industry, 282, 283; in lapidary industry, 248; in meat packing, 330; in men's and women's clothing, 291; in millinery, 292; in organ industry, 201; in paper and pulp, 304, 305; in piano industry, 201; in pottery industry, 222; in printing, publishing, and allied industries, 302, 312; in rayon industry, 281; retail, 453-57; in shirtmaking, 289; in shoemaking, 261; in silk and rayon industry, 279; in soap manufacture, 361; in steel industries, 238; tentmaking industry, 286; in tinware industries, 251; in turpentine industry, 362; wage earners by, 156 f.; wholesale and retail, 452, 453; in woolen-goods industry, 277; in worsted-goods industry, 278**
- Manufacturing industries, amount of production of, 587; available labor for, 149, 152; distribution of workers in, 155 ff.; effects of transportation on, 375; engravers in, 308; employment in, 138; man-hours in, 28; technological advances in, 21-26; unemployment in, 2**
- Manufacturing and mechanical industries, gainfully employed in, 134, 143, 147, 150, 160; occupational groups in, 131; trends in, 15, 16, 18, 19, 20, 21, 22, 26, 38**
- Marble workers, see** *Stone cutters and workers in marble and stone yards*
- Markets, agricultural, 82; for automobiles, 235; for cement, 220; for chemical products, 353; clerical force effected by, 587; effects of transportation on, 397; fluctuations of, 146; for food, 315, 321, 329, 333; for glass, 212, 218; for iron and steel, 232; for labor, 407, 408, 422, 423, 581, 590; for leather, 254, 255, 258; for lumber, 103; for paper products, 301, 302, 303, 307; for radios, 192; for rubber, 360; for steel products, 239; for tobacco products, 337, 338**

- Marines, 469, 470, 471, 489
- Marshals, 469, 470, 471, 472, 482, 488
- Masters, *see* Captains, masters, mates, and pilots
- Mates, *see* Captains, masters, mates, and pilots
- McKay sewing machine, 254
- Meat packing, 158, 324; value added by manufacture, 330. *See also* Fish, curing and packing of; Slaughtering and meat packing
- Mechanical industries, *see* Manufacturing and mechanical industries
- Mechanics, in air transportation, 408, 409, 411; automobile, 383 ff., 391; fire, 482; in glass industry, 216
- Merchant marine, 237, 407
- Merchants, 435, 436, 437, 441, 450-53, 458
- Mercury, 120, 121
- Mergers, 163; of banks, 445; by capital groups, 588. *See also* Industrial concentration; Monopolies
- Messengers, in clerical service, 584, 585, 592, 593, 597; in communication, 413 ff., 418, 419
- Metal factories, other, 252; engravers in, 308
- Metal operatives, not specified, 222
- Metals, 139, 150, 181, 182, 227 ff.
- Metals group, 131, 240 ff. *See also* Minerals
- Metallurgists, *see* Chemists, assayers, and metallurgists
- Midwives and nurses, 561, 562, 563, 579 ff.
- Milk, *see* Butter, cheese, and condensed milk factories
- Millers, 314 ff., 331, 332
- Milliners and millinery dealers, 265, 292. *See also* Hats; Hat factories
- Millinery dealers, *see* Milliners and millinery dealers
- Mills, Ogden, on labor-saving machines, 23
- Millwrights, 222. *See also* Machinists
- Minerals, numbers of extractors of, 115; by states, 118
- Miners, coal, 2, 116, 129; other than coal, 116; other than gold, 129
- Mining, carpenters in, 181; explosives for, 348, 354; machinists in, 227; methods of, 124; painters in, 182. *See also* Minerals
- Mining engineers, *see* Engineers
- Model- and patternmakers, 368 ff., 373
- Molders, founders, and casters, 222, 230
- Monopolies, labor effected by, 159; in medicine, 535, 539; in newspapers, 525; in sugar business, 335; in telephone industry, 427, 428. *See also* Concentration; Mergers; Single units
- Morticians, 464, 465
- Morse telegraphers, 420
- Motion picture, 158; helpers in production, 559; occupations classified, 557. *See also* Cinema
- Motor trucking, 388, 389. *See also* Automobiles
- Motor vehicles, 139, 157, 234, 236, 252, 383, 385, 460, 483. *See also* Automobiles
- Motormen, 392 ff., 402
- Musical instruments, 158
- Musicians and music teachers, 493, 494, 495, 496, 497, 500, 501, 509
- National Association of Manufacturers, on technological displacements, 23
- National guard, 489
- National Research Project, on technology, 56
- National Resources Committee, on unemployment, 137
- Navy, 476, 489. *See also* Sailors
- Negroes, house servants of, 574; as house servants, 575
- Newsboys, 465, 467
- Newspapers, demand for, 312; number of, 313, 522, 523; printing of, 309, 310; production of, 139. *See also* Paper publishing
- National Youth Administration: of California, on aircraft industry, 410; number of workers in, 477; of Illinois, on women's hats, 293
- Nondurable goods, 143
- Nonferrous metals, *see* Metals
- Notaries, 469, 470, 471, 491
- Nurserymen, *see* Gardeners, florists, and nurserymen
- Nurses, *see* Midwives and Nurses
- Occupational classifications, 3, 31 ff.; of the census, 131, 150, 180, 286; of chemical workers, 352; of engravers, 308; vertical, 40 ff.
- Occupational cycles, 61
- Occupational scale, 41
- Occupations, of architects, 518; barriers to, 57; changes in, 51, 59, 63; classification of, 29 ff., 40 ff., of gainful workers, 22, 25, 32 ff.; geographical distribution of, 38; government regulation of, 51, 52; identified with industries, 161; incomes of, 48-51; mechanization of, 172, 175; periods of, 4; in public service, 468; segregation of, 159; shifts of, 5, 29; specialty, 467
- Officials, in extraction of minerals, 116, 128; Edwards' classification of, 41-43; of institutions, 490; of insurance companies, 461; of laundries,

- 578; of lodges, etc., 557; in motion-picture production, 557; public, 469, 470, 471, 479, 492; in radio industry, 557; real estate, 462; of steam railroads, 392 ff.; of street railroads, 399 ff., 402; of telegraph and telephone companies, 413 ff., 418, 425, 426; of theaters, 557; in trade, 435, 436, 437, 441, 447; in transportation and communication enterprises, 431, 432. *See also* Garage owners, managers, and officials
- Office boys and girls, 584, 585
- Office workers, in manufacturing, 149
- Officers, salaried, 151, 281; of ships, 407; probation and truant, 469, 470, 471, 488; of the Army and Navy, 476; law-enforcement, 482-86
- Ogburn, William, on technological trends, 23
- Oil and gas wells, carpenters in, 181; engineers in, 549; painters in, 182; production of, 120, 121; technology in, 126, 129; workers in, 116, 118
- Oilers of machinery, 159 ff., 165
- Operatives, in the automobile industry, 235; in blankbooks, etc., factories, 307; in box factories, 302, 303; in car and railroad shops, 392 ff., in chemical products factories, 335, 343, 347, 348, 349, 353, 354, 356, 357, 359, 360, 362, 363, 371; in cleaning and dyeing establishments, 570, 571; in food factories, 313, 315, 316, 318, 319, 322, 324, 325, 328, 330, 331, 333, 334, 335; in lead and zinc factories, 249; in leather industries, 254; in laundries, 578; in metals, 245; in paper and pulp mills, 303-305; in paper-box factories, 306; in printing, publishing, and engraving industries, 311, 312; in the steel industry, 239, 240; in textile mills, 280, 285, 293; in tinware and enamelware factories, 250. *See also* Laundry operatives and managers
- Operators, in brick tile and terra-cotta manufacture, 211; of busses, 391; in extraction of minerals, 116, 127, 128; of fire-alarms, 482; of garages, 380; of hotels and boardinghouses, 560; of office machines, 594, 596; printer-telegraph, 420; real estate, 462; of saloons, 561, 562, 563; telephone, 422, 423, 424, 482; in telephone and telegraph industries, 413 ff., 418; of tractors, 380, 382; of truck and transfer companies, 387; of typesetting machines, 302
- Orchestras, 511
- Organ factories, 194 ff., 201. *See also* Piano and organ factories
- Osborn, F., on farm population, 72
- Osteopath, *see* Physicians and surgeons
- Output, of automobile industry, 234, 236; of chemical plants, 353; of cigars and tobacco, 337, 338, 339; of flour, 317; of foods, 316; of glass industry, 215; of lawyers, 532; of leather, 262; per man-hour, 144; of paper and pulp mills, 305; of paper-box factories, 306; of pig iron, 226; of rolling mills, 233; of rope and cordage factories, 285; of salt, 333; in steam railroads, 397; of textiles, 273, 274. *See also* Production
- Overall factories, *see* Suit, coat, and overall factories
- Overseers, in administrative and service groups, 159 ff., 163; in extraction of minerals, 116; female, 162; of laundries, 578; in road and street building and repairing, 469, 470, 471; of steam railroads, 392 ff., of street railroads, 399 ff.; of telegraph and telephone companies, 413 ff., 427; in trade, 447; in transportation and communication pursuits, 430, 431, 432. *See also* Farmers, planters and overseers
- Owens automatic machine, 214
- Owners, of cleaning and dyeing businesses, 570; of common carriers, 389; of farms, 87, 88, 91; of forest lands, 105, 106; of laundries, 578; of lumber camps, 110; and managers of log and timber camps, 101, 103, 109; and managers of truck, transfer, and cab companies, 383 ff.; of newspapers, 526; of paper mills and pulp mills, 305; of small enterprises, 430; of stores, 455; of theaters, 557; of undertaking establishments, 465. *See also* Garage owners, managers, and officials; Proprietors; Single units
- Oystermen, 100
- Painters, glaziers, and enamelers, 168, 181; by industries, 182
- Paints and varnishes, factories, 344 ff., 349, 358; production of, 139
- Paper, printing, and allied industries, 131, 150; carpenters in, 181; machines in, 227; painters in, 182, 298 ff.
- Paper and pulp industry, value added by manufacture, 304, 305
- Paper and pulp mills, 298, 302, 303, 304
- Paper-box factories, 298 ff., 302, 303, 306
- Paper industry, 139, 158
- Paper hangers, 168, 184
- Parcel post, 430
- Partnerships, 452, 457

- Passengers, on airplanes, 408, 409; on electric railroads, 401; by miles of traffic, 388, 389, 395; on steam railroads, 396, 397
- Patents, 516
- Peddlers, *see* Hucksters and peddlers
- Peebles, Allon, on investment for doctors' equipment, 536; on dentists' incomes, 543
- Periodicals, 309, 310, 522, 523. *See also* Magazines
- Personal service, *see* Domestic and personal service
- Petroleum, 121, 122; engineers in, 549; production, 139, 158; refineries for, 344 ff., 349, 356. *See also* Oil and gas wells
- Photographers, 493, 494, 495, 496, 497, 500, 501, 503, 519-22
- Photographic apparatus, 158
- Physicians and surgeons, 493, 494, 495, 496, 497, 498, 500, 501, 534 ff., 559
- Piano and organ factories, 158, 194 ff., 201. *See also* Organ factories
- Pianos and organs, value added by manufacture, 201
- Pig iron, 226, 237. *See also* Iron and steel
- Pilots, air, 408, 409, 411. *See also* Captains, masters, mates, and pilots
- Pipe, 158, 230
- Pipe lines, 413 ff.
- Planing mills, 139, 158, 204. *See also* Saw and planing mills
- Planters, *see* Farmers, planters and overseers
- Plasterers and cement finishers, 168, 184
- Pleasure resorts, keepers of, 557
- Plumbers and apprentices, 168, 185
- Plumbing supplies, 158, 186
- Plural units, *see* Single units
- Police departments, 477
- Police systems, 485 f.
- Policemen, 469, 470, 471, 485-87, 489
- Polishers, *see* Filers, grinders, buffers, and polishers
- Population, in administrative and service work, 161; by age groups, 44-48; in agriculture, 76; in building trades, 170, 176, 179; in chemical industries, 347, 348, 353; in the clay, glass, and stone group, 224, 229; in clerical work, 585; in the cigar and tobacco group, 336, 339; in communication, 416, 432; decennial changes in, 102; distribution of, 10; in domestic and personal work, 560, 564; in electrical work, 187 ff.; in extraction of minerals, 117; on farms, 72; in food industries, 313, 315, 317, 318, 319, 320; in forestry and fishing, 102; in the leather group, 256, 258; in the lumber and furniture group, 196 ff.; in the machinists, millwrights, and toolmakers group, 228; in manufacturing and mechanical work, 134, 147, 149, 166; in the metals group, 242; in paper, printing, and allied industries, 298, 300, 308; by occupations, 22; in professional pursuits, 496, 497, 499; in the public service, 468, 472; in schools, 504; in the textile and clothing group, 263, 268, 277, 280; in trade, 435, 438; in transportation and communication, 377, 381, 386, 395, 400, 432; undercount of, 13, 14; unemployed, 453; urban, 587
- Porters, 465, 467, 561, 562, 563, 566, 581
- Post offices, 415, 416, 477
- Postal service group, 415 ff.
- Postmasters, 413 ff., 415
- Posner, Harold L., on technology, 57, 137
- Potters and pottery workers, 205, 220
- Pottery, 158, 205 ff.; value added by manufacture, 221
- Power, for street railroads, 401
- Power plants, 477
- President's Research Committee, on erosion, 59; on farm tenancy, 91
- Pressers, *see* Cleaning and dyeing workers and pressers
- Presses, in glass industry, 215; in printing, 309
- Pressmen, 303, 311. *See also* Printers
- Price, of automobiles, 389; of candy, 323; of chemical products, 351; of motor fuel, 391
- Printers, 302, 303, 309, 310; and lithographers, 299 ff., 303, 310, 313
- Printing, publishing, and allied industries, 298 ff., 302, 308, 309, 520; value added by manufacture, 309
- Producers, number of, 30
- Production, in the automobile industry, 235, 236; in broom and brush industry, 372, 373; of buttons, 295; of candy, 323; of canned fruits, 327; of cement, 219; of chemical products, 348, 350; of clothes, 296; of coal, 124; comparisons of, 123; of corsets, 294; of cotton textiles, 273, 274; of crops, 77 ff.; in electrical industries, 190; of electricity, 193; in express work, 429; by farms, 83 ff., of farm workers, 82, 98; of flour, 331; of foods, 314 ff.; of gas, 357, 358; in glass industry, 212, 214 ff.; of glove factories, 293; of lace, 287; of leather goods, 254 ff.; of liquor, 332; of lumber, 104, 105, 170; in lumber and furniture, 197, 200, 204; in manufacturing and mechanical

- industries, 136 ff.; in meat products, 328; of metal manufactures, 253; of minerals, 118-22, 127; by model- and patternmakers, 373; of natural gas, 126; of paper products, 301, 302, 304; of paper and pulp mills, 305; of parts, 245; of petroleum, 356; in printing industries, 312; of radios, 192; of rayon, 281; of salt, 333, 334; of single units, 153; of soap, 361; of steel, 138, 142, 143, 237, 238; of suit, coat, and overall factories, 290; in telephone industry, 421, 428; of tin-ware and enamelware, 250; of tobacco products, 337, 338, 342, 343; of white lead, 182; in the United States, 587; volume of, 28, 30, 51. *See also* Consumption; Output
- Professional persons, Edwards' classification of, 41-43
- Professional pursuits, 493, 494, 495, 496, 497, 500, 501, 551 ff.
- Professional service, engineers in, 549; trends in, 17, 18, 19, 20, 21, 22, 493 ff.; vertical classification of, 41-43
- Professional standards, 51
- Professors, *see* Teachers and professors
- Proprietors, artisan, 293, 457, 465, 571; of boardinghouses, apartments, etc., 567; Edwards' classification of, 41-43; of flour mills, 332; of garages, 385; of laundries, 578; number of, 151; of single units, 588; small, 458; of stores, 452, 455; of telephone and telegraph companies, 413 ff., 418; of tourist camps, 568; in trade, 435, 436, 437, 441, 447; of transportation and communication enterprises, 431, 432; of undertaking establishments, 464. *See also* Farm owners, Merchants; Owners
- Public service, engineers in, 549; workers in, 492; trends in, 17, 18, 19, 20, 21, 22, 38, 60, 468 ff.
- Puddlers, *see* Furnacemen, smeltermen, heaters, puddlers, etc.
- Pulp, 139, 158. *See also* Paper and pulp mills
- Pulp wood, 106
- Pyrites, 120, 121
- Quarries, 116-27, 129, 181
- Race tracks, keepers of, 557
- Radio, and acting, 512; and advertising, 378; apparatus for, 158; and music, 510; officials in, 557; operators of, 413 ff., 417; signaling devices of, 486; workers in, 413
- Radio production, 192, 245
- Radio telephone, 427
- Raftsmen, 100, 101, 102, 108, 110
- Railroads, 220, 378, 388, 389, 395, 429, 430. *See also* Electric railways; Steam and street railroads; Steam railroads; Street railroads; Transportation
- Rails, 398
- Rayon, 139, 143, 158, 264 ff., 270, 280, 281
- Real estate agents, *see* Agents
- Recreation, in forest areas, 107. *See also* Semiprofessional and recreational pursuits
- Refineries, 139. *See also* Sugar refining
- Refrigeration, 315, 328
- Refrigerators, 158, 575
- Religious workers, 557
- Relief projects, workers on, 477
- Reporters, *see* Authors, editors, and reporters
- Restaurant and lunchroom keepers, saloon operators, and bartenders, 561, 562, 563, 582
- Restaurants, bread for, 320; failures of, 456
- Retail trade, 452 ff. *See also* Stores; Trade
- Road and street building and repairing, 469, 470, 471, 490
- Road and street transportation, 376 ff, laborers in, 379, 433, 434; workers in, 380, 382 ff.
- Roads, cement for, 220; engineers on, 549; government employees on, 477; paved, 390; public service workers on, 490. *See also* Highways
- Rollers and roll hands (metals), 222, 233, 237 ff.
- Roofers and slaters, 168, 185
- Rope and cordage factories, 264 ff., 270, 284
- Rubber, 139, 158, 343, 344, 347, 349, 359. *See also* Tires and tubes
- Russell Sage Foundation, on social workers, 555
- Saddles, *see* Harness and saddles
- Sail, awning, and tent factories, 264 ff., 270, 285
- Sailors, 469, 470, 471, 489; and deckhands, 403, 404, 406
- Salaries, 152, 281, 354 ff., 363, 364, 365, 366, 407, 409, 425, 426, 442, 443, 445; of chemists, 546; of clergymen, 528; of engineers, 547, 550; of federal employees, 477, 478; of firemen, 481, 482; of librarians, 553; of newspaper workers, 527; of policemen, 486; of social workers, 555; of teachers, 506, 507. *See also* Income
- Sales, by kinds of stores, 452, 453, 454, 455; of newspapers, 524; part-payment, 587; wholesale, 457
- Salesmen and saleswomen, 425, 435,

- 436, 437, 441, 442, 443, 451, 458-60, 587. *See also* Commercial travelers
- Saloon operators, *see* Restaurant and lunchroom keepers, saloon operators, and bartenders
- Salt, 121, 314, 333, 334
- Salt wells, carpenters in, 181; painters in, 182, 333
- Samplers, 466
- Saw and planing mills, 138, 194 ff., 204
- Schools, 503-9; employees of, 476, 477; dental, 540; for librarians, 552; medical, 535
- School teachers, *see* Teachers and professors
- Scrap iron, 122, 123. *See also* Iron
- de Schweinitz, Dorothea, on employment in stores, 460; on retail trade, 457; on salesmen, 459
- Seamen, *see* Boatmen; Captains; Longshoremen; Sailors
- Seamstresses, *see* Dressmakers and seamstresses
- Secretaries, in fire departments, 482. *See also* Clerical service
- Semiprofessional and Recreational pursuits, 493, 494, 495, 496, 497, 500, 557 ff.
- Semiskilled workers, Edwards' classification of, 41-43; effects of technology on, 54; on office machines, 592. *See also* Operatives
- Servants, Edwards' classification of, 41-43; and waiters, housekeepers, and stewards, 560 ff., 565, 571 ff.
- Service occupations, 30, 31
- Sette, Oscar E., on employment in fishing, 113
- Sewing machines, 158, 254, 290; operators of, 298
- Sex groups, in administrative and service occupations, 161 ff.; in agriculture, 74, 75, 77, 85, 97; in building trades, 178; in Census of Occupations, 3; in chemical industries, 350; in cigar and tobacco workers group, 339; in clay, glass, and stone industries, 210; in clerical occupations, 592, 593; in domestic and personal service, 565; in electrical industries, 189; in fish curing and packing, etc., 330; in food industries, 318; of gainful workers, 15, 20; in iron and steel industries, 221-29; in leather industries, 259; in lumber and furniture manufacture, 198; in manufacturing and mechanical occupations, 136; in metals group, 244; in miscellaneous chemical industries, 371; in paper, printing, and allied industry, 302; in professional service, 499; in the public service, 478; in rubber factories, 360; in textile and clothing industries, 271; in trade, 440-42; in transportation and communication, 382
- Sextons, *see* Janitors and sextons
- Sharecroppers, 87, 88
- Sheet metal workers, 240, 249
- Sheriffs, 469, 470, 471, 486, 487
- Ship- and boat-building, 158, 404; factory operatives in, 222, 237. *See also* Vessels
- Shirt, collar, and cuff factories, 265, 270, 288 ff.
- Shoe industry, 254 ff.; stores in, 455, 460; value added by manufacture, 261; wages paid, 261. *See also* Boots and shoes
- Shoemakers, 254, 255, 257
- Showmen, *see* Actors and showmen
- Signaling devices, 380, 396, 427, 486, 591
- Silk mills, 264 ff., 270, 271, 278
- Silk and rayon, 139, 158, 279. *See also* Rayon
- Silver, 121. *See also* Gold and silver mining.
- Silversmiths, 240
- Single units, 151, 153, 445, 588. *See also* Chain banks; Chain hotels; Chain newspapers; Chain stores
- Skilled workers, in automobile industry, 235; in blankbook, etc., factories, 307; Edwards' classification of, 41-43; effects of technology on, 54; in miscellaneous chemical industries, 368 ff., 374; in textiles and clothing, 263, 275, 287; and unions, 50
- Slaters, *see* Roofers and slaters
- Slaughtering and meat packing, 314 ff., 319, 324 ff., 328
- Smeltermen, *see* Furnacemen, smeltermen, heaters, puddlers, etc.
- Smelters, 139
- Smelting and refining, 158
- Smith, Philip H., on welding, 229
- Soap, 158, 344 ff., 349, 360; value added by manufacture, 361
- Social workers, 551, 552, 554 ff.
- Soldiers, 469, 470, 471, 472, 489
- States, dissimilarity of, 38; crops in, 77; forest areas and workers in, 106; minerals in, 118
- Steam and street railroads industry, carpenters in, 181; painters in, 182; machinists in, 228
- Steam fitters, 185. *See also* Plumbers and apprentices
- Steam railroads, engineers in, 549; laborers in, 433, 434; machinists in, 227; salaries in, 409; workers in, 376 ff., 380, 391 ff., 398 ff.
- Steel, 123; fabrication of, 187, 205; production of, 138, 142, 158, 171, 237; as substitutes, 218; used in furniture, 230. *See also* Iron

- Steel mill operatives, *see* Blast furnace and steel rolling mills; Rollers and roll hands (metal)
- Stenographers and typists, 584, 585, 591, 592, 593, 598, 599
- Stern, Boris, on labor productivity in the textile industry, 273
- Stevadores, *see* Longshoremen and stevedores
- Stewards, *see* Servants, waiters, housekeepers, stewards
- Stewardesses, 382
- Stock raisers, 74, 75, 85, 93
- Stone cutters and workers in marble and stone yards, 205, 218
- Stone masons, *see* Brick and stone masons
- Stores, 452-57, 459-60. *See also* Chain stores
- Straw workers, 368 ff., 374
- Streetcars, 389, 398
- Street-cleaning workers, 469, 470, 471
- Street railroads, 376 ff.; engineers in, 549; government employees in, 477; laborers in, 379, 398 ff., 433, 434
- Streets, *see* Roads
- Strike, *see* Industrial disputes
- Substitutes, for buttons, 295; for leather, 258; in printing methods, 313; rayon used as, 280; for silk, 279
- Suit, coat, and overall factories, 265 ff., 270, 290
- Sugar, 138, 145, 335
- Sugar refining, 158, 314, 334
- Sulphur, 121, 122, 125, 127
- Superintendents, in fire departments, 482; of steam railroads, 392 ff.; of street railroads, 399 ff. *See also* Officials
- Surgeons, *see* Physicians and surgeons
- Surveyors, 547, 548
- Sutherland, Edwin H., on laws, 483; on police, 488
- Swain, Dr. Robert E., on chemists, 544
- Switchmen and flagmen, 392, 393, 394, 399, 400
- Tailors and tailoresses, 265 ff., 296
- Tanneries, 254, 257, 261
- Tariffs, 279
- Tax laws, 528, 589
- Taxi drivers, 380
- Teachers and professors, 493, 494, 495, 496, 497, 498, 499, 500, 501 ff. *See also* Artists and teachers of art; Musicians and teachers of music
- Teamsters, *see* Draymen, teamsters, and carriage drivers
- Technical engineers, *see* Engineers, technical
- Technology, 22-29, 53; agricultural, 83; in automobile industry, 236; in automotive industry, 390; in business, 595; in chemical production, 348; and chemists, 544; in cotton textile factories, 269, 275; and female workers, 62; in glass industry, 213, 218; in iron and steel industry, 232, 239; in jewelry manufacturing, 246; in leather industry, 254; in liquor industry, 332; limits of, 439; in mail transportation, 417; in manufacturing industries, 139, 145, 159, 172, 204; in metal manufacture, 245; in mining, 123; and office workers, 589; in paint manufacturing, 359; in paper industries, 301, 305; in petroleum production, 126; in printing, 312; in rayon production, 281; in rolling mills, 237; in rope and cordages factories, 285; in soap industry, 362; in steam railroad industry, 392, 396, 397; in sugar refining, 334; in tanneries, 262; in telephone industry, 421, 423, 427, 428; in tinware industry, 250; in the tobacco industry, 340; in woollen and worsted mills, 276
- Telegraph tickers, 420
- Telegraphy, 418
- Telephone and telegraph workers, 412, 413, 418 ff., 549
- Telephones, 378, 421 ff., 486, 591
- Teletype, 486
- Television, 379, 427
- Tenants, 87, 88, 91 ff.
- Tenders, *see* Machine tenders; Elevator tenders
- Tent factories, *see* Sail, awning, and tent factories
- Textile finishing mills, *see* Dyeing, finishing, and printing mills
- Textile industries, carpenters in, 181; engravers in, 308; machinists in, 227; painters in, 182
- Textile machinery, 158
- Textiles and clothing, 131 ff., 150, 263 ff., 265, 270, 297; value added by manufacture, 263, 276, 277, 278, 279, 281, 283, 284, 285, 286, 288, 290, 291, 292, 294, 295
- Terra-cotta workers, *see* Brick, tile, and terra-cotta workers
- Testers, 235
- Theater ushers, 559
- Thorp, Willard I., on plural and single units, 154
- Tile workers, *see* Brick, tile, and terra-cotta workers
- Timber cruisers, 101, 102, 106. *See also* Lumbermen
- Time, on technological unemployment, 23
- Tin, 123
- Tin cans, 158
- Tinsmiths, 240 ff., 249

- Tinware, value added by manufacture, 251
- Tinware and enamelware makers, 240 ff., 250 ff.
- Tires and tubes, 139, 158. *See also* Rubber
- Tobacco production, 139, 336. *See also* Cigar and tobacco group
- Tobacco trust, 341
- Toolmakers, 222. *See also* Machinists
- Tourist camps, 568
- Tractor drivers, *see* Operators of tractors
- Tractors, 83
- Trade, 435 ff.; engineers in, 549; engravers in, 308; other persons in, 435, 436, 437, 441, 465 ff.; trends in, 16, 18, 19, 20, 21, 22, 38
- Trade unions, *see* Unions
- Tradesmen, 435, 440
- Transportation, banking affected by, 446; chain stores affected by, 455; of clay products, 211; crime affected by, 483; deliverymen affected by, 465; effect on publishing, 312; of fish, 112; of foods, 316, 321, 328, 331; of liquors, 332; motor, 388; trolley, 402; unemployment in, 2; vehicles for, 230; veterinarians affected by, 543
- Transportation and communication, workers in, 430, 433, 434; trends in, 16, 18, 19, 20, 21, 22, 38, 375 ff.
- Truck drivers, 382, 383
- Trunks, suitcases, and bags, 254, 257, 262
- Tryon, F. G., on mining employment, 115
- Turpentine farms and distilleries, 344 ff., 349, 362
- Turpentine industry, value added by manufacture, 362
- Typewriters, 158, 590, 591, 598
- Typists, *see* Stenographers and typists
- Undertakers, 435, 436, 437, 441, 463-65
- Unemployed, classification of, 2; on relief projects, 477
- Unemployment, of actors, 513; and income, 453; of postal clerks, 417; of teachers, 507-9; technological, 22-29, 56, 57, 137; among water transportation workers, 404. *See also* Employment
- Unions, 48, 50, 175, 310, 311, 341, 396, 565, 589
- Unskilled workers, 41-43, 167. *See also* Laborers
- Upholsterers, 194 ff., 199
- Upholstery, 254
- Varnishers, *see* Painters, varnishers, and enamelers
- Vegetables, 138, 328. *See also* Fruit and vegetable canning
- Vessels, 404, 405, 406. *See also* Ship- and boat-building
- Veterinarians, 493, 494, 495, 496, 497, 499, 500, 501, 503, 543 f.
- Wage earners, number of, 151; output of, 144. *See also* Gainful workers; Wages
- Wages, in air transportation, 408; of artists, 515; of automobile workers, 234; in bakeries, 319, 320, 321; in banks, 445, 446; in blacking, stains, and dressing industry, 366; in bone black, carbon black, and lampblack industry, 365; in broom and brush industry, 372; in candy factories, 323; in canning, 328; in casket-making establishments, 464; in chemical industries, 350, 354; in cosmetics industry, 364; in domestic service, 572; in electrical industry, 191; in druggists' preparations industry, 363; of federal employees, 477, 478; in glass industry, 215, 217; in glue and gelatin manufacture, 364; of house servants, 574, 575; of laundry workers, 579; in jewelry manufacture, 246 ff.; of jewelry workers, 246 ff.; in meat packing, 330; minimum, 145; government, 453; in paper and pulp industry, 304, 305; in photographic establishments, 521; in piano and organ factories, 201; in pottery, 221; reduction in, 69; in shoe industry, 261; in shoemaking, 261; in soap factories, 361; in steam railway industry, 396; in steel mills, 238; of stenographers, 598; in telegraph companies, 419; of telephone operators, 424, 425; of telephone workers, 426; in textile manufactures, 276, 277, 278, 279, 281, 283, 284, 285, 286, 288, 290, 291, 292, 293, 294, 295; in tinware industry, 251; in the turpentine industry, 362; value of, 152; in undertaking establishments, 464; in water transportation, 407. *See also* Salaries; Wage earners
- Wagon and carriage factory operatives, 222, 233
- Waiters, 575, 576. *See also* Servants, waiters, and housekeepers
- Walker, Sydnor H., on social workers, 555
- Washing machines, 158
- Watches, *see* Clocks and watches
- Watchmen, *see* Guards and watchmen
- Water transportation, carpenters in, 181; engineers in, 549; laborers in,

- 379, 433, 434; trends in, 380; workers in, 376 ff., 402
- Weavers, hand-loom, 136
- Weekly News Review*, on lawyers' incomes, 531
- Weintraub, David, on technology, 57, 137
- Welding, 229, 231
- Welfare workers, *see* Social workers
- Wells, Shirley, on movie extras, 512
- Wheat, 78, 82, 84
- White-collar workers, percentage of, 43
- White lead, 182
- Wholesale trade, factories in, 292, 322; sales from, 457, 588. *See also* Trade
- Window dressers, 466
- Women, in air transportation, 382; as barbers and hairdressers, 567; as bookkeepers, 595; in canneries, 326, 328; in cleaning and dyeing works, 570; in clerical work, 590, 591; as commercial travelers, 449; in food industries, 315, 323; as keepers of boardinghouses, etc., 568; as librarians, 552; in meat packing, 330; in news agencies, 420; in paper and printing industries, 302, 303; as radio operators, 418; in real estate, 462; as servants, 565, 574; in shirt factories, 289; as social workers, 555, 556; in tanneries, 262; as telephone operators, 423; in tobacco production, 340, 342; as waitresses, 575. *See also* Females
- Woodchoppers, 100, 101, 102, 108, 110
- Woodpulp, 105, 305. *See also* Pulp wood
- Woodworkers, 194 ff.
- Woodworking factories, 202
- Woolen and worsted goods, 139, 264, 270, 271, 276, 277, 278, 298
- Works Progress Administration, number of workers, 477
- X-ray photographs, 520
- Yardmen, 392 ff.
- Zinc, 121, 123, 158, 240 ff.

OCCUPATIONAL TRENDS